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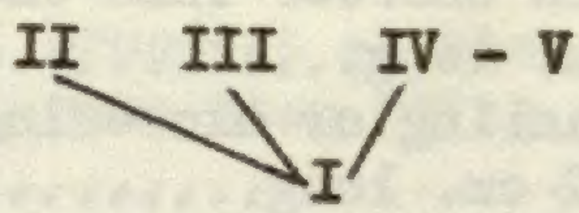
NOTES ON BROMELIACEAE, XVII

Lyman B. Smith

MEXICO and CENTRAL AMERICA

HECHTIA

In making keys there is usually the problem of whether to attempt a natural arrangement with the simple and presumably primitive species first or to make one that is frankly artificial. An artificial key separates the smaller groups first as a matter of clarity and convenience and these groups are usually composed of the more complex species that logically would be at the end of a natural key. In Hechtia it is not possible to say what is a natural sequence beyond the relation of the primary groups to each other. Consequently I am making an artificial key to the major groups but giving them a natural or, as it happens, reverse enumeration. The distinctions between groups are much the same as in my key in the North American Flora (19:84. 1938), except for the increased emphasis on an inferior ovary. This last has the advantage of bringing together the southernmost species, H. dichroantha and H. guatemalensis, as they obviously should be. The natural relationship of the groups is probably thus:



Group V is advanced because of the inferior ovary and its development has been mainly southward. Group III has developed greater protection for its flowers enabling it to spread north in cooler climates.

1. Ovary or its remnant almost or wholly inferior (the remnant appearing to be an apical swelling of the pedicel in the staminate flowers).....Subkey V
1. Ovary or its remnant largely or wholly superior, staminate pedicels when present not abruptly swollen at apex.
 2. Sepals and floral bracts drying uniformly roseate with no hyaline margin.....Subkey IW
 2. Sepals and floral bracts brown, stramineous or hyaline, or if roseate (H. elliptica, H. scariosa) then with hyaline margins.
  3. Floral bracts strongly convex, ample, always exceeding the pedicels and usually much of the sepals.....Subkey III
  3. Floral bracts flat, usually much shorter than the sepals, or if convex then shorter than the pedicels; flowers distinctly pedicellate in most species.
   4. Leaves densely serrulate with teeth not more than 0.5 mm. long; plant delicate, less than 1 m. high; inflorescence

very lax.....Subkey II
4. Leaves laxly and coarsely serrulate or where not known the plant coarse and over 1 m. high.....Subkey I

Subkey I

1. Inflorescence slenderly cylindric; branches simple or 3-parted at base, not over 12 cm. long and usually much less.
2. Branches laxly flowered; pedicels slender, 3-8 mm. long; scape-bracts much exceeding the internodes.
1. H. pedicellata
2. Branches densely flowered, or flowers subverticillate.
3. Rhachis much flattened; branches often 3-parted from the base.....2. H. podantha
3. Rhachis subterete; branches simple.
4. Pistillate sepals 3.5-4 mm. long, obtuse; rhachis stout, 9-10 cm. long.
5. Leaf-blades strongly repand; rhachis subalate.
3. H. subalata
5. Leaf-blades with straight margins between the spines; rhachis nearly even.....4. H. melanocarpa
4. Pistillate sepals 1-2 mm. long.
6. Rhachis to 10 cm. long, ascending; lower primary bracts long-caudate from an ovate base; floral bracts shorter than to exceeding the pedicels.....5. H. caudata
6. Rhachis 2-5 cm. long.
7. Floral bracts much shorter than the pistillate pedicels; rhachis to 5 cm. long.....6. H. mooreana
7. Floral bracts equaling or exceeding the pistillate pedicels; rhachis 2 cm. long.....7. H. lanata
1. Inflorescence pyramidal or if subcylindric then broad with elongate branches.
8. Key to pistillate plants.
9. Floral bracts equaling or shorter than the pedicels; racemes evenly flowered in most species.
10. Pedicels continuous with the rhachis, not articulated.
11. The pedicels stoutly obconic, 3.5 mm. long; seeds with a thick blunt wing.....8. H. roseana
11. The pedicels slenderly cylindric, 4-10 mm. long.
12. Leaf-spines to 5 mm. long; upper scape-bracts remote; pedicels 4-8 mm. long, slender.....9. H. montana
12. Leaf-spines 2 mm. long; scape-bracts all large and imbricate; pedicels 10 mm. long, almost filiform.
10. H. matudae
10. Pedicels articulated with the rhachis.
13. Carpels even except for a median ridge; pedicels strongly triquetrous.....11. H. glabra
13. Carpels reticulate; pedicels sulcate, subterete.
12. H. reticulata
9. Floral bracts much exceeding the very short pedicels at anthesis; racemes interrupted and more or less moniliform; flowers strict.

14. Rhachis slender, even or faintly angled.
13. H. stenopetala
14. Rhachis stout, deeply sulcate.....14. H. galeottii

8. Key to staminate plants.
15. Sepals acute.
16. Stamens included.....9. H. montana
16. Stamens exserted.
17. Sepals much thickened toward base; pedicels stout; racemes interrupted.....15. H. suaveolens
17. Sepals uniformly membranaceous; pedicels slender; racemes slightly or not at all interrupted.....16. H. reflexa
15. Sepals broadly obtuse, rarely apiculate.
18. Rhachis strongly compressed throughout.
19. Stamens included; floral bracts equaling or shorter than the pedicels.....11. H. glabra
19. Stamens exserted; floral bracts exceeding the pedicels.
17. H. conzattiana
18. Rhachis compressed only at base.
20. The rhachis slender, even or faintly angled.
21. Stamens included.....18. H. sphaeroblasta
21. Stamens exserted.....13. H. stenopetala
20. The rhachis stout, deeply sulcate.....14. H. galeottii

Subkey II

1. Sepals ovate, broadest at about one-third of their length; flowers 3 mm. long.....19. H. lindmanioides
1. Sepals subtriangular, broadest at base; flowers 5 mm. long.
2. Pedicels 3 mm. long, more than twice as long as the floral bracts.....20. H. tillandsioides
2. Pedicels less than 1 mm. long, equaling or shorter than the floral bracts.....21. H. lundelliorum

Subkey III

1. Flowers 8-10 mm. long; floral bracts stramineous or roseate with broad scarious margins.
2. Sepals at least as broad as long.
3. The sepals acute, 6 mm. long.....22. H. texensis
3. The sepals obtuse, 3.5 mm. long.....23. H. mexicana
2. Sepals much longer than broad.
4. The sepals elliptic, obtuse; leaves splashed with bright rose.....24. H. elliptica
4. The sepals acute; leaves green.
5. Floral bracts and sepals roseate with broad scarious margins.....25. H. scariosa
5. Floral bracts pale stramineous.....26. H. zacatecae
1. Flowers 4-7 mm. long.
6. Spikes elongate, lax or sublax except sometimes at extreme apex.
7. Inflorescence amply tripinnate with the branches pinnately divided.....27. H. schottii
7. Inflorescence bipinnate except at base where the branches are palmately 3-parted.....28. H. fosteriana

6. Spikes abbreviated, dense.
8. Sepals acute.
9. Leaves densely lepidote on both sides.....29. H. argentea
9. Leaves glabrous above.....30. H. capituligera
8. Sepals obtuse.
10. Primary bracts broadly ovate or suborbicular, narrowed abruptly to a long-acuminate apex.
11. Leaf-blades glabrous above; branches short, mostly exceeded by the 3 cm. long primary bracts..31. H. confusa
11. Leaf-blades densely pale-lepidote on both sides; staminate branches to 55 mm. long and pistillate to 40 mm., both mostly exceeding the primary bracts.
32. H. marnier-lapostollei
10. Primary bracts lanceolate or narrowly triangular, inconspicuous.
12. Leaves all coarsely serrate.....33. H. glomerata
12. Leaves (only the inner known) finely serrate.
34. H. gamopetala

Subkey IV

1. Scape-bracts much exceeding the internodes, foliaceous.
35. H. desmetiana
1. Scape-bracts much shorter than the internodes, vaginiform.
2. Flowers subsessile.....36. H. rosea
2. Flowers distinctly pedicellate.
3. Floral bracts equaling or exceeding the pedicels.
37. H. meziana
3. Floral bracts about half as long as the pedicels.
38. H. laxissima

Subkey V

1. Flowers distinctly pedicellate, the ovary remnant appearing to be a thickening of the upper part of the pedicel; petals rose.....39. H. epigyna
1. Flowers subsessile; petals white.
2. Floral bracts conspicuous, equaling the ovary of the pistillate flowers and nearly equaling the sepals of the staminate; flowers not more than spreading....40. H. dichroantha
2. Floral bracts inconspicuous; flowers mostly reflexed.
41. H. guatemalensis

1. HECHTIA PEDICELLATA S. Wats. Proc. Am. Acad. 26:155. 1891; Contr. Gray Herb. 117:16, pl. 1, figs. 30, 31. 1937; No. Am. Fl. 19:89. 1938.
MEXICO: Jalisco.

2. HECHTIA PODANTHA Mez in DC. Monogr. Phan. 9:549. 1896; Contr. Gray Herb. 117:15, pl. 1, figs. 27, 28. 1937; No. Am. Fl. 19: 88. 1938.
Hechtia liebmannii Mez, Bot. Jahrb. 30:Beibl. 67:6. 1901.
Hechtia tehuacana B. L. Robinson, Proc. Boston Soc. Nat. Hist. 31:265. 1904.

MEXICO: Hidalgo, Morelos, Puebla.

3. HECHTIA SUBALATA L. B. Smith, Contr. Gray Herb. 117:15, pl. 1, fig. 29. 1937; No. Am. Fl. 19:88. 1938.
MEXICO: Duran^go, Zacatecas.

4. HECHTIA MELANOCARPA L. B. Smith, Contr. Gray Herb. 161:32, pl. 4, figs. 8, 9. 1946.
MEXICO: Guerrero.

5. HECHTIA CAUDATA L. B. Smith, sp. nov.

A H. mooreana L. B. Smith, cui affinis, foliis multo majoribus, ramis longioribus, floribus subverticillatis nullo modo secundis differt.

Flowering 12 dm. high (! Foster); leaves over 5 dm. long; sheaths suborbicular, to 9 cm. wide, except at apex entire, brown and lustrous; blades narrowly triangular, 55 mm. wide, red, succulent (! Foster), covered with coarse appressed cinereous scales on both sides, partially glabrous above with age, laxly serrate with antrorse curved spines 2 mm. long; scape (staminate only) flattened at base and presumably lateral, 5 mm. in diameter at apex, glabrous; scape-bracts densely imbricate, ovate with long linear subentire lepidote blades; inflorescence bipinnate, cylindric, glabrous; lower primary bracts like the scape-bracts, the upper much reduced and bladeless; branches to 10 cm. long, slender, slightly compressed at base, rather dense with the flowers subverticillate; floral bracts ovate, apiculate, flat, 4 mm. long, exceeding the pedicels; pedicels slenderly obconic; staminate flowers (immature) 4 mm. long; sepals broadly ovate, obtuse, 2 mm. long; pistillate sepals (very old) broadly ovate; capsule ovoid, acute, 11 mm. long, yellow-brown. Pl. I, fig. 1: Section of staminate branch x 1; fig. 2: Staminate flower x 2; fig. 3: Staminate sepal x 2; fig. 4: Pistillate flower (fruit) x 1; fig. 5; Old pistillate sepal x 2.

Type in the U. S. National Herbarium, collected on rocks, between Tehuantepec and Tuxtla, State of Oaxaca, Mexico, altitude 300 meters, April 8, 1957, by Mulford B. Foster and O. C. Van Hyning (No. 2999).

6. HECHTIA MOOREANA L. B. Smith, Contr. U. S. Nat. Herb. 29:522, fig. 78. 1954.
MEXICO: Guerrero.

7. HECHTIA LANATA L. B. Smith, sp. nov.

A H. mooreana L. B. Smith, cui affinis, foliis multo majoribus, scapi bracteisque lanatis, inflorescentiae ramis brevioribus differt.

Flowering 45-60 cm. high (! Foster); leaves over 1 m. long, lanate at first (! Foster); sheaths reniform, 6 cm. high, densely lepidote at apex beneath, elsewhere glabrous, dark castaneous, lustrous; blades narrowly triangular, 7 cm. wide, covered beneath with appressed cinereous scales, with age glabrous and lustrous

above, densely serrate at base, laxly so elsewhere with antrorse curved spines 5 mm. long; scape central (! Foster), 5-6 mm. in diameter, lanate at first (! Foster); scape-bracts small, about equaling the internodes, ovate with a linear lanate blade; inflorescence slenderly cylindric; primary bracts like the upper scape-bracts, about equaling the branches; branches 2 cm. long, densely flowered; floral bracts exceeding the pedicels but narrow and nearly flat, serrulate; pedicels narrowly obconic, the staminate 2 mm. long, the pistillate 2.5 mm.; sepals broadly ovate, obtuse, 1.5 mm. long, serrulate; staminate petals obtuse, 4 mm. long; stamens included; capsule ovoid, acute, 9 mm. long, castaneous, even, lustrous. Pl. I, fig. 6: Staminate flower x 2; fig. 7: Staminate sepal x 2; fig. 8: Pistillate branch x 1; fig. 9: Old pistillate sepal x 2.

Type in the U. S. National Herbarium, collected on rocks in a very windy area, near Tequisistlan, State of Oaxaca, Mexico, altitude 2400 meters, April 1, 1957, by Mulford B. Foster and O. C. Van Hyning (No. 2934).

8. HECHTIA ROSEANA L. B. Smith, Contr. Gray Herb. 117:17, pl. 1, figs. 41, 42. 1937; No. Am. Fl. 19:90. 1938.
MEXICO: Puebla.

9. HECHTIA MONTANA Brand. Erythea 7:9. 1899; Contr. Gray Herb. 117:16, pl. 1, figs. 38-40. 1937; No. Am. Fl. 19:90. 1938.
Hechtia pedicellata sensu I. M. Johnston, Proc. Calif. Acad. IV. 12:995. 1924.
MEXICO: Baja California, Sonora, Sinaloa.

10. HECHTIA MATUDAE L. B. Smith, Phytologia 5:395, pl. 1, figs. 1, 2. 1956.
MEXICO: Morelos.

11. HECHTIA GLABRA Brand. Univ. Calif. Publ. Bot. 7:325. 1920; Contr. Gray Herb. 117:17, pl. 1, figs. 43-45. 1937; No. Am. Fl. 19:91. 1938.
MEXICO: Vera Cruz.

12. HECHTIA RETICULATA L. B. Smith, Contr. Gray Herb. 117:17, pl. 1, fig. 46. 1937; No. Am. Fl. 19:91. 1938.
MEXICO: Colima.

13. HECHTIA STENOPETALA Kl. Allg. Gart. 3:402. 1835; Contr. Gray Herb. 117:18, pl. 1, figs. 47-50. 1937; No. Am. Fl. 19:91. 1938.
Hechtia cordylinoides Baker, Bot. Mag. 107: pl. 6554. 1881.
Hechtia pringlei Robinson & Greenman, Am. Journ. Sci. III. 50: 167. 1895.
MEXICO: Puebla, Oaxaca.

14. HECHTIA GALEOTTII Mez in Fedde Rep. Spec. Nov. 16:71. 1919; Contr. Gray Herb. 117:18, pl. 1, figs. 51, 52. 1937;

Fl. 19:92. 1938.
MEXICO: Oaxaca.

15. HECHTIA SUAVEOLENS E. Morr. ex Mez in DC. Monogr. Phan. 9: 550. 1896; Contr. Gray Herb. 117:18, pl. 1, fig. 53. 1937; No. Am. Fl. 19:92. 1938.
MEXICO: Indefinite.

16. HECHTIA REFLEXA L. B. Smith, Contr. Gray Herb. 117:18, pl. 1, figs. 54, 55. 1937; No. Am. Fl. 19:92. 1938.
MEXICO: Michoacán.

17. HECHTIA CONZATTIANA L. B. Smith, Contr. Gray Herb. 117:19, pl. 1, fig. 56. 1937; No. Am. Fl. 19:93. 1938.
MEXICO: Oaxaca.

18. HECHTIA SPHAEROBLASTA B. L. Robinson, Proc. Am. Acad. 35:323. 1900; Contr. Gray Herb. 117:19, pl. 1, fig. 57. 1937; No. Am. Fl. 19:93. 1938.
MEXICO: Guerrero.

19. HECHTIA LINDMANIOIDES L. B. Smith, Contr. Gray Herb. 117:14, pl. 1, figs. 24-26. 1937; No. Am. Fl. 19:88. 1938.
MEXICO: Vera Cruz.

20. HECHTIA TILLANDSIOIDES (André) L. B. Smith, Contr. U. S. Nat. Herb. 29:431. 1951.
Bakeria tillandsioides André, Rev. Hort. 61:84, pl. 1889.
Hechtia purpusii Brand. Univ. California Publ. Bot. 7:325. 1920.
Bakerantha tillandsioides L. B. Smith, Contr. Gray Herb. 104: 72. 1934.
MEXICO: Vera Cruz.

21. HECHTIA LUNDELLIORUM L. B. Smith, No. Am. Fl. 19:97. 1938.
MEXICO: San Luis Potosí.

22. HECHTIA TEXENSIS S. Wats. Proc. Am. Acad. 20:374. 1885; Contr. Gray Herb. 117:19, pl. 1, figs. 58, 59. 1937; No. Am. Fl. 19:93. 1938.
UNITED STATES: Texas.

23. HECHTIA MEXICANA L. B. Smith, Contr. Gray Herb. 117:19, pl. 1, fig. 60. 1937; No. Am. Fl. 19:94. 1938.
MEXICO: San Luis Potosí.

24. HECHTIA ELLIPTICA L. B. Smith, Contr. Gray Herb. 117:20, pl. 1, figs. 61, 62. 1937; No. Am. Fl. 19:94. 1938.
MEXICO: Coahuila.

25. HECHTIA SCARIOSA L. B. Smith, Contr. Gray Herb. 117:20, pl. 1, figs. 63, 64. 1937; No. Am. Fl. 19:94. 1938.

UNITED STATES: Texas.
MEXICO: Coahuila, Tamaulipas.

26. HECHTIA ZACATECAE L. B. Smith, Contr. Gray Herb. 117:21, pl. 1, figs. 65, 66. 1937; No. Am. Fl. 19:95. 1938.
MEXICO: Zacatecas.

27. HECHTIA SCHOTTII Baker in Hemsl. Biol. Centr.-Am. Bot. 3:318. 1884; Contr. Gray Herb. 117:22, pl. 1, figs. 69, 70; No. Am. Fl. 19:96. 1938.
Hechtia bracteata Mez in DC. Monogr. Phan. 9:550. 1896.
Hechtia myriantha Mez, Bot. Jahrb. 30, Beibl. 67:6. 1901.
Hechtia macrophylla Greenman, Field Mus. Publ. Bot. 2:247. 1907.
MEXICO: Vera Cruz, Yucatan, Chiapas.

28. HECHTIA FOSTERIANA L. B. Smith, sp. nov.

A H. schottii Baker, cui affinis, inflorescentiae ramis simplicibus vel infimis basi 3-partitis differt.

Flowering 15 dm. high; leaves over 1 m. long; sheaths reniform, 10 cm. wide, glabrous except at apex, very dark castaneous and lustrous on both sides; blades narrowly triangular, 7 cm. wide, glabrous above, covered with appressed cinereous scales beneath, densely serrate at base, laxly so above with curved antrorse spines 6 mm. long; scape curved and flattened at base and presumably lateral, 11 mm. wide at apex; scape-bracts broadly triangular, exposing almost the whole scape but their linear mostly entire blades equaling or exceeding the internodes; inflorescence (pistillate only) bipinnate except at base, 9 dm. long (! Foster); primary bracts triangular, small and inconspicuous; branches simple except the basal which are 3-parted at base, to 14 cm. long, rather evenly and sublaxly flowered, sulcate, flattened at base; floral bracts broadly ovate, acute, 4 mm. long, much exceeding the stout obconic pedicel; sepals ovate-oblong, obtuse, 3 mm. long, hyaline with a thickened brown base; petals 4 mm. long, white; capsule ovoid, acute, 8 mm. long, sharply trigonous, brown, even, sublustrous. Pl. I, fig. 10: Section of pistillate branch x 1; fig. 11: Old pistillate sepal x 2.

Type in the U. S. National Herbarium, collected on rocks, near Tequisistlan, State of Oaxaca, Mexico, altitude 2100 meters, April 1, 1957, by Mulford B. Foster and O. C. Van Hyning (No. 2935).

29. HECHTIA ARGENTEA Baker ex Hemsl. Biol. Centr.-Am. Bot. 3:317. 1884; Bot. Mag. 122: pl. 7460. 1896; Contr. Gray Herb. 117:21. 1937; No. Am. Fl. 19:95. 1938.
Hechtia argentea K. Koch, Wochenschr. Gärtn. 7:176. 1864. Nomen.
MEXICO: Indefinite.

30. HECHTIA CAPITULIGERA Mez in DC. Monogr. Phan. 9:546. 1896; Contr. Gray Herb. 117:21, pl. 1, figs. 67, 68. 1937; No. Am.

Fl. 19:95. 1938.
MEXICO: San Luis Potosí.

31. HECHTIA CONFUSA L. B. Smith, Contr. Gray Herb. 117:22, pl. 1, figs. 71, 72. 1937; No. Am. Fl. 19:96. 1938.
MEXICO: Puebla.

32. HECHTIA MARNIER-LAPOSTOLLEI L. B. Smith, Bromel. Soc. Bull. 11:58, figs. 1961.
MEXICO: Indefinite.

33. HECHTIA GLOMERATA Zucc. Abh. Akad. München. 3:240, pl. 6. 1840; Contr. Gray Herb. 117:23, pl. 1, figs. 73, 74. 1937; No. Am. Fl. 19:96. 1938.
Dasylirion pitcairniaefolium Karw. & Zucc. ex Zucc. Allg. Gart. 6:258. 1838, not Hechtia pitcairniaefolia Verlot. 1868.
Hechtia ghiesbreghtii Lemaire, Ill. Hort. 10: pl. 378. 1863.
Hechtia morreniana Mez in DC. Monogr. Phan. 9:547. 1896.
UNITED STATES: Texas.
MEXICO: Tamaulipas, San Luis Potosí.
GUATEMALA: Quiché, Huehuetenango.

34. HECHTIA GAMOPETALA Mez in DC. Monogr. Phan. 9:549. 1896; Contr. Gray Herb. 117:23, pl. 2, figs. 1-3. 1937; No. Am. Fl. 19:97. 1938.
MEXICO: Indefinite.

35. HECHTIA DESMETIANA (Baker) Mez in DC. Monogr. Phan. 9:551. 1896; Contr. Gray Herb. 117:14. 1937; No. Am. Fl. 19:86. 1938.
Dyckia desmetiana Baker, Bot. Mag. 120: pl. 7340. 1894.
Bromelia desmetiana Baker, Bot. Mag. 120: under pl. 7340. 1894, in synonymy.
MEXICO (?).

36. HECHTIA ROSEA E. Morr. ex Baker, Handb. Bromel. 140. 1889; Contr. Gray Herb. 117:14. 1937; No. Am. Fl. 19:87. 1938.
Hechtia roezlii Baker, Handb. Bromel. 140. 1889, in synonymy.
MEXICO: Indefinite.

37. HECHTIA MEZIANA L. B. Smith, Proc. Am. Acad. 70:149, pl. 1, figs. 2, 3. 1935; Contr. Gray Herb. 117:14. 1937; No. Am. Fl. 19:87. 1938.
MEXICO: Oaxaca, Chiapas.

38. HECHTIA LAXISSIMA L. B. Smith, Contr. U. S. Nat. Herb. 29: 521, fig. 77. 1954.
MEXICO: Michoacan.

39. HECHTIA EPIGYNA Harms, Notizblatt 12:531. 1935; Contr. Gray Herb. 117:16, pl. 1, figs. 34-37. 1937; No. Am. Fl. 19:89 1938.
MEXICO: Tamaulipas.

40. HECHTIA DICHROANTHA Donn. Smith, Bot. Gaz. 42:299. 1906; Contr. Gray Herb. 117:14, pl. 1, figs. 19, 20. 1937; No. Am. Fl. 19:86. 1938.
GUATEMALA: Baja Verapaz, Chiquimula (?).
HONDURAS: Morazán.

41. HECHTIA GUATEMALENSIS Mez in Fedde Rep. Nov. Spec. 3:14. 1906; Contr. Gray Herb. 117:16, pl. 1, figs. 32, 33. 1937; No. Am. Fl. 19:89. 1938.
GUATEMALA: El Progreso, Zacapa, Chiquimula, Guatemala.
SALVADOR: Achuapán, Salvador.
HONDURAS: Comayagua, Olancho.
NICARAGUA: Jinotega.

Note: Standley and Williams have labelled material of H. dichroantha and H. guatemalensis with three different unpublished names, and at first glance there appears to be considerable justification although there are no notes to indicate distinguishing characters. There is great variation in the size of the branches, density of the flowers, and size and shape of the capsules. However, intergradation is so complete that I hesitate to make even varieties.

TILLANDSIA REMOTA Wittm. in Engler, Bot. Jahrb. 14, Beibl. 32:6. 1891; Mez in DC. Monogr. Phan. 9:637, 673. 1896.
Tillandsia tenuifolia sensu L. B. Smith, No. Am. Fl. 19:133. 1938, in part, as to Tillandsia remota Wittm.

In describing Tillandsia remota, Wittmack did not see complete stamens and did not commit himself as to their length, although he surmised that they about equaled the petals. Mez made the rather natural assumption that, like the majority of species in Mexico and Central America, it had exserted stamens. Furthermore the habit of T. remota is so close to that of T. tenuifolia that it is difficult to distinguish them without good flowers, Mez's key character of spike position being worthless. Actually the spikes, bracts and flowers of T. remota are even smaller than those of T. tenuifolia, and the axes still more slender. Also T. remota has distinctly nerved floral bracts and posterior sepals more than half connate, but the spreading petals and included stamens are the most distinctive characters, placing the species in the subgenus Allardtia instead of in subgenus Tillandsia with T. tenuifolia. To date T. remota is known from Mexico, Guatemala and Salvador. Pl. I, fig. 12: Inflorescence (Bernoulli 1193) x 1/2; fig. 13: Inflorescence (Foster & Van Hyning 2986) x 1; fig. 14: Petal and stamen x 2.

COSTA RICA

TILLANDSIA ABDITA L. B. Smith, sp. nov.

A T. brachycaulos Schlecht., cui affinis, foliorum vaginis haud distinctis, laminis latioribus, bracteis florigeris sepalisque lepidotis differt.

Stemless; leaves numerous, suberect, 16 cm. long, covered with

appressed cinereous scales, reddish; sheaths merging with the blades; blades narrowly triangular, acuminate, ca. 2 cm. wide, slightly recurving; scape very short, wholly concealed by the leaves; inflorescence depauperate-compound, few-flowered, capitate, much exceeded by the leaves; primary bracts foliaceous but reduced, much exceeding the spikes; spikes densely 2-flowered, complanate; floral bracts oblong, acute, 17 mm. long, exceeding the sepals, carinate, membranaceous, subdensely lepidote with pale brown appressed scales; flowers subsessile; sepals free, exactly like the floral bracts; petals and stamens unknown. Pl. I, fig. 15: Leaf x 1/2; fig. 16: Spike x 1; fig. 17: Sepal x 1.

Type in the Chicago Natural History Museum, collected on the Cerro de Escasú, Province of San José, Costa Rica, August 1935, by Fernando Solís (No. 314).

ECUADOR

PITCAIRNIA HARLINGII L. B. Smith, sp. nov.

A P. cuatrecasana L. B. Smith, cui affinis, inflorescentiae indumento ferrugineo, sepalis acuminatis differt.

Known only from one leaf and an inflorescence but flowering shoot probably over 1 m. long; leaf linear-lanceolate, acuminate at both ends, subpetiolate, 15 dm. long, 5 cm. wide, laxly serrulate throughout, glabrous above, covered with pale ferruginous appressed scales beneath, channeled toward base; scape over 5 dm. long, apparently decurved, densely and finely ferruginous-lanate, red (! Harling); scape-bracts ovate, exceeding the internodes, entire, ferruginous-lanate, the lower ones with long caudate blades; inflorescence simple, 4 dm. long, lax, ferruginous-lepidote except the petals; floral bracts triangular-ovate, acuminate, to 55 mm. long, exceeding the lower pedicels; flowers spreading at anthesis, then decurved; pedicels to 25 mm. long, rather slender; sepals triangular-ovate, acuminate, 35 mm. long, slightly carinate toward base, brick red (! Harling); petals linear, curved at anthesis, 7 cm. long, appendaged, orange (! Harling); ovary 2/3 inferior; ovules alate. Pl. I, fig. 18: Flower x 1/2; fig. 19: Sepal x 1; fig. 20: Base of petal x 1.

Type in the Naturhistoriska Riksmuseum, Stockholm, collected in thicket at river, El Topo, Provi nce of Napo-Pastaza, Ecuador, altitude 1250 meters, November,28, 1958, by Gunnar Harling (No. 3426).

PITCAIRNIA UNILATERALIS L. B. Smith, sp. nov.

Ab omnibus speciebus adhuc cognitis, foliorum laminis linearibus integerrimis, inflorescentia simplici dense secundiflora, petalis flavis appendiculatis, ovulis caudatis differt.

Pendent in clumps (! Harling); leaf-blades linear, acuminate at base and apex, over 2 m. long, 19 mm. wide, entire, glabrous above, covered beneath with a whitish membrane of coalesced scales, bearing a broad white median band that becomes the full width of the blade at base; scape unknown; inflorescence evidently simple, 38 cm. long, densely secund-flowered, except for the

petals densely and finely white-arachnoid; axis 7 mm. in diameter; floral bracts triangular, to 15 mm. long; pedicels slender, 12 mm. long; flowers spreading; sepals narrowly triangular, acute, 18 mm. long, carinate toward base; petals linear, 6 cm. long, pale yellow, bearing a suborbicular crenate scale at base; ovary more than 1/2 inferior; ovules caudate. Pl. I, fig. 21: Flower x 1/2; fig. 22: Sepal x 1; fig. 23: Base of petal x 1.

Type in the Naturhistoriska Riksmuseum, Stockholm, collected from steep rocks by river, Rio Daule below Pichincha, Hacienda Santa Barbarita, Province of Guayas, Ecuador, April 18-26, 1959, by Gunnar Harling (No. 4785).

BRAZIL

AECHMEA MURICATA (Arr. Cam.) L. B. Smith, comb. nov.

Bromelia muricata Arr. Cam. Diss. Pl. Brasil. 21. 1810.

Ananas muricatus (Arr. Cam.) Roem. & Schult. Syst. 7, pt. 2: 1287. 1830; J. L. Collins, The Pineapple 31. 1960.

Aechmea stephanophora E. Morr. ex Baker, Handb. Bromel. 67. 1889.

Chevalieria stephanophora (E. Morr. ex Baker) Mez in DC. Monogr. Phan. 9:154. 1896.

Collins indicated quite correctly, I believe, that Ananas muricatus and Chevalieria stephanophora are identical. This situation necessitates a new combination in Aechmea to which genus Chevalieria has been reduced.

ANANAS MONSTROSUS (Carr.) L. B. Smith, comb. nov.

Ananassa monstrosa Carr. Rev. Hortic. 42:288, fig. 45. 1870.

Ananas lyman-smithii Camargo, Arquiv. Jard. Bot. Rio de Janeiro 14:281. 1956, without Latin diagnosis.

As demonstrated by Camargo, Ananas monstrosa is a perfectly typical pineapple except that it completely lacks the foliaceous apical coma on the inflorescence. This lack of a coma would indicate that A. monstrosa is probably the most primitive species in the genus.

Plate I

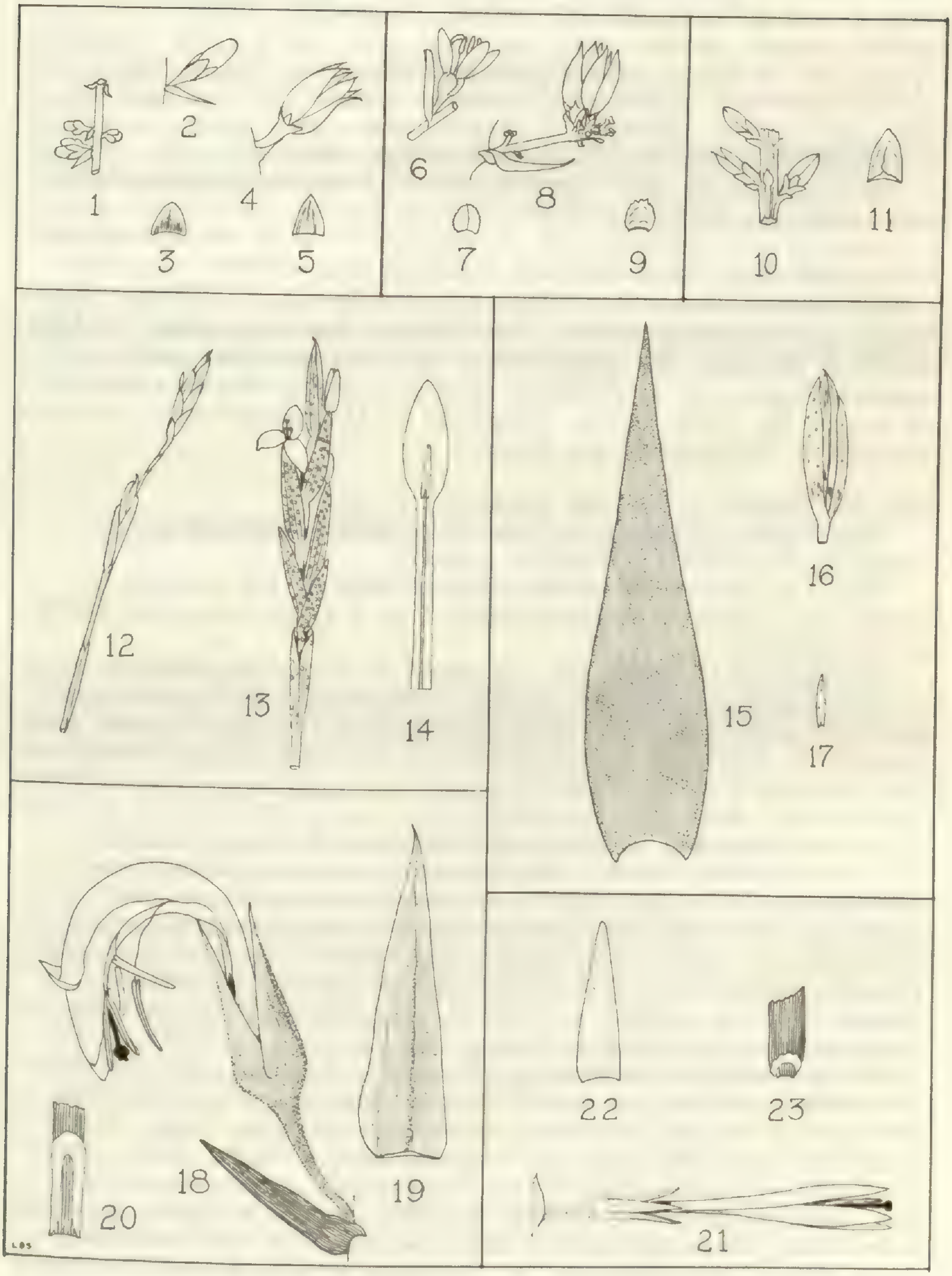


Fig. 1-5: Hechtia caudata; fig. 6-9: Hechtia lanata; fig. 10, 11: Hechtia fosteriana; fig. 12-14: Tillandsia remota; fig. 15-17: Tillandsia abdita; fig. 18-20: Pitcairnia harlingii; fig. 21-23: Pitcairnia unilateralis.

NOTES ON NEW AND NOTEWORTHY PLANTS. XXVIII

Harold N. Moldenke

CITHAREXYLUM ROSEI var. PILOSUM Moldenke, var. nov.

Haec varietas a forma typica speciei laminis foliorum subtus parce longeque pilosis recedit.

This variety differs from the typical form of the species in having the lower leaf-surfaces sparsely long-pilose.

The type of the variety was collected by Rogers McVaugh (no. 17152) in a roadside thicket near Rancho Huaracha, about 5 miles south of Hacienda Las Rosas, which is about 20 miles south of Aguascalientes, at an altitude of 1950 meters, Jalisco, Mexico, on August 18, 1958, and is deposited in the herbarium of the University of Michigan at Ann Arbor.

GMELINA ARBOREA f. DENTATA Moldenke, f. nov.

Haec forma a forma typica speciei laminis foliorum parce grosseque subloboideo-dentatis recedit.

This form differs from the typical form of the species in having its leaf-blades marked with 2 or 3 large lobe-like teeth on the margins.

The type of the form was collected by Azizullah Shah at Jhajra, Siwalik & Jaunsar, India, on March 14, 1922, and is deposited in the herbarium of the University of California at Berkeley.

CONGEA ROCKI Moldenke, sp. nov.

Frutex scandens; ramis gracilibus dense fulvo-tomentosis; foliis oppositis; laminis anguste ellipticis vel elliptico-oblongis vel suboblanceolatis acuminatis integris, ad basin subcordatis, supra nitidis, subtus dense fulvo-pubescentibus; inflorescentiis axillaribus simplicibus valde elongatis 6--10-capitulatis densissime fulvo-tomentosis et parcissime villosis, sympodiis valde elongatis, bracteis involucrantibus 3 parvis, supra densissime albo-tomentosis, subtus fulvo-villosis.

Woody vine; stems slender, obtusely tetragonal, densely fulvous-tomentose with scattered long-villous hairs interspersed, wearing off in age; principal internodes 4--5 cm. long; leaves decussate-opposite; petioles very slender, 5--7 mm. long, densely fulvous-hirsute; leaf-blades chartaceous, brunnescent in drying, very shiny above, lighter beneath, narrow elliptic or elliptic-oblong, sometimes almost oblanceolate, 5.5--10.5 cm. long, 2--3.4 cm. wide, acuminate at the apex, entire, subcordate-rounded at the base, mostly glabrous above except for the pilose margins and puberulent midrib, densely fulvous-pubescent beneath, the hairs longer on the midrib; inflorescence in the upper leaf-axils, apparently simple, elongate, widely divergent, with 3--5 pairs of small opposite heads; peduncles slender, about 3.5 cm.

long, densely fulvous-tomentose and scattered long-villous; sympodia similar to the peduncles, greatly elongated, 4.5--7.5 cm. long, with a pair of foliaceous bracts at each node; bracts green, elliptic, about 1 cm. long and 5 mm. wide, rather densely fulvous-pubescent on both surfaces, short-stipitate, acute at the apex; heads sessile, 3-flowered; involucral bracts 3, narrow-elliptic, 10--14 mm. long, 4 mm. wide, obtuse or subacute at the apex, very densely white-tomentose above, very densely fulvous-villous beneath; calyx campanulate, 3--4 mm. long, very densely fulvous-villous with long forward-pointing and very conspicuous hairs; corolla undeveloped.

The type of this very distinct species was collected by Joseph Francis Charles Rock (no. 1677) — in whose honor it is named — between Ta Kaw and Meh Soi, Thailand, on January 4, 1922, and is deposited in the herbarium of the University of California at Berkeley.

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ADDITIONAL NOTES ON THE GENUS AEGIPHILA. XVI

Harold N. Moldenke

AEGIPHILA Jacq.

Additional literature: Aristeguieta, Clave & Descrip. Fam. Arb. Venez. 192, 193, 230, & 277. 1954; A. R. Schultz, Inst. Tec. Rio Grande do Sul Pub. 30: 15. 1960; Rambo, Pesquisas 4: 18. 1960; Angely, Liv. Gen. Bot. Bras. 35 & 37. 1960; Moldenke, Phytologia 7: 451—464 & 467—506. 1961.

Vernacular names recorded by Aristeguieta for members of this genus in Venezuela are "chicharro" and "yuco blanco".

An additional excluded species is: Aegiphila martiana Schau. ex Moldenke, Alph. List Cit. 2: 445, sphalm. 1948 = Petrea martiana Schau.

AEGIPHILA ACULEIFERA Moldenke

Austin Smith adds the following notes about this species: tree with base 1 m. wide; limbs long, lateral; bark dark-brown; leaves membranous, rather fleshy, dark-green, shining, very glabrous, the venation reticulated, the midrib light-green; buds round or flat-topped, pure white; calyx and ovary pale-green; pedicels darker green; petals opening flat or slightly reflexed, 8 mm. long, pure white; stamens and pistil long-exserted. He says that it is a showy tree when in bloom, inhabiting wet loam soil in semi-shade of the subtropical zone.

Additional citations: COSTA RICA: Alajuela: A. Smith P.2035 (Ca--12690).

AEGIPHILA AUSTRALIS Moldenke

Additional literature: A. R. Schultz, Inst. Tec. Rio Grande

do Sul Pub. 30: 15. 1960.
Schultz, in the reference cited above, reduces this species with a question to A. integrifolia (Jacq.) Jacks.

AEGIPHILA BOGOTENSIS (Spreng.) Moldenke
Additional citations: ECUADOR: Tunguragua: Asplund 7980 (S).

AEGIPHILA BRACHIATA Vell.
Additional synonymy: Aegiphila branchiata Vell. apud A. R. Schultz, Inst. Tec. Rio Grande do Sul Pub. 30: 15, sphalm. 1960.
Additional literature: Rambo, Pesquisas 4: 18. 1960; A. R. Schultz, Inst. Tec. Rio Grande do Sul Pub. 30: 15. 1960; Moldenke, Phytologia 7: 459. 1961; Angely, Fl. Paran. 17: 46. 1961.

AEGIPHILA CANDELABRUM Briq.
Additional citations: PARAGUAY: Woolston 844 (Ca—86405).

AEGIPHILA CORDATA Poepp.
Woytkowski describes this species as a tree 12 meters tall, with yellow-green flowers in September, and says that it is rare in forests at 1000 meters altitude.
Additional citations: PERU: Junín: Woytkowski 5977 (Z).

AEGIPHILA COSTARICENSIS Moldenke
Additional citations: MEXICO: Chiapas: Matuda 2101 (Ca—913674).

AEGIPHILA CRENATA Moldenke
Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 464. 1961.

AEGIPHILA FLUMINENSIS Vell.
Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 472. 1961.

AEGIPHILA HASSLERI Briq.
Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 476—477. 1961.

AEGIPHILA LHOTZKIANA Cham.
Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 484. 1961.

AEGIPHILA MEMBRANACEA Turcz.
Steyermark & Nilsson describe this plant as a vine, with chartaceous leaves, the peduncles, pedicels, and calyx pale-green, the corolla pale-yellow, the style whitish, and the two stigmas (=style-branches) yellow-white. They found it on a wooded ridge, at 1220 meters altitude, blooming in April.
Additional citations: VENEZUELA: Bolívar: Steyermark & Nilsson 193 (Z).

AEGIPHILA OBDUCTA Vell.

Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 492. 1961.

AEGIPHILA PARAGUARIENSIS Briq.

Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 494--495. 1961.

AEGIPHILA SELLOWIANA Cham.

Additional literature: Angely, Fl. Paran. 17: 46. 1961; Moldenke, Phytologia 7: 501--502. 1961.

AEGIPHILA TRUNCATA Moldenke

Additional literature: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Phytologia 4: 415. 1953; Moldenke, Résumé 65 & 442. 1959; Moldenke, Phytologia 7: 506. 1961.

Metcalf & Cuatrecasas report that this species is a tree 30 m. tall, the fruits green with brown spots in February, found at altitudes of 240 to 260 meters.

Additional citations: COLOMBIA: Antioquia: Metcalf & Cuatrecasas 30072 (Ca--687224).

AEGIPHILA UMBRACULIFORMIS Moldenke

Literature: Moldenke, Phytologia 5: 225. 1955; Moldenke, Biol. Abstr. 30: 4394. 1958; Moldenke, Résumé 82 & 442. 1959.

Ferreyra describes the flowers of this plant as purple outside, pinkish-white within.

Citations: PERU: Huámuco: Ferreyra 2190 (W--2026718); Stork & Horton 9495 (Ca--647102--type).

AEGIPHILA UNIFLORA Urb.

Literature: Urb., Symb. Ant. 3: 365--366. 1903; J. A. Clark, Card. Ind. Gray Herb. 1903; Prain, Ind. Kew. Suppl. 3: 4. 1908; Moldenke, Brittonia 1: 254, 264, 360--362, & 473. 1934; Moldenke, Phytologia 1: 271--272. 1937; Moldenke, Geogr. Distrib. Avicenn. 6. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 85. 1942; Moldenke, Alph. List Cit. 1: 258 & 303. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 46 & 175. 1949; Moldenke, Résumé 54 & 442. 1959.

AEGIPHILA VALERII Standl.

Additional and emended literature: Moldenke, Brittonia 1: 252, 258, 263, 289--292, & 476. 1934; Moldenke, Geogr. Distrib. Avicenn. 13 & 17. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15, 22, & 85. 1942; Moldenke, Alph. List Cit. 1: 325 & 326 (1946) and 2: 344. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 87. 1948; Moldenke, Alph. List Cit. 3: 714, 715, & 962 (1949) and 4: 1051--1053 & 1082. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28, 39, & 175. 1949; Moldenke, Phytologia 4: 415. 1953; Moldenke, Résumé 34, 46, & 442. 1959.

Illustrations: Moldenke, Phytologia 2: 443, fig. 5. 1948.

Additional citations: MEXICO: Chiapas: Matuda 4876 (W--

2087069).

AEGIPHILA VALLENSIS Moldenke

Additional literature: Moldenke, Alph. List Cit. 4: 1214. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 59 & 175. 1949; Moldenke, Phytologia 4: 415. 1953; Moldenke, Résumé 65 & 442. 1959.

AEGIPHILA VELUTINOSA Moldenke

Literature: J. A. Clark, Card Ind. Gray Herb. 1932; Moldenke, Brittonia 1: 194 (1932) and 1: 280, 403, 426, 437--438, & 472. 1934; Moldenke, Phytologia 1: 272. 1937; Moldenke, Geogr. Distrib. Avicenn. 23. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 85. 1942; Moldenke, Alph. List Cit. 1: 122 (1946) and 4: 1032. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 71 & 175. 1949; Moldenke, Résumé 82 & 442. 1959.

AEGIPHILA VENEZUELENSIS Moldenke

Literature: Moldenke, Alph. List Cit. 2: 352 (1948) and 3: 975 & 976. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62 & 175. 1949; Moldenke in Steyermark, Fieldiana 28: 514--515. 1953; Moldenke, Phytologia 4: 415. 1953; Steyermark, Fieldiana 28: 1178. 1957; Moldenke, Résumé 70 & 442. 1959.

Collectors describe this plant as a shrub or slender shrub, 2.5—5 m. tall, or a small tree to 12 m. tall, the slender stem about 1 cm. in diameter, the leaves firmly membranaceous, dark- or deep-green and shiny above, paler green beneath, the stems, petioles, and peduncles appressed buff-tomentose, the rachis and pedicles gray-green, the calyx pale-green and appressed buff-tomentose, the corolla white or whitish, 9 mm. long, its lobes 4 mm. long and 2.5 mm. wide, the filaments white, the anthers buff-brown, and the fruit turning yellow. It is said to be occasional in scrub forests and quebradas, in upper mixed Clusia-Magnolia forests, and along streambeds, at altitudes of 1600 to 2300 meters, blooming in January, February, and June, and fruiting in December and January. It has been misidentified in herbaria as a species of Daphnopsis.

Additional citations: VENEZUELA: Amazonas: Cowan & Wurdack 31298 (N); Maguire, Cowan, & Wurdack 30042 (N). Bolívar: B. Maguire 32940 (N), 33014 (N); Steyermark 75664 (N), 75835 (Z); Steyermark & Wurdack 1089 (N).

AEGIPHILA VENEZUELENSIS var. SERRATA Moldenke

Literature: Moldenke, Phytologia 6: 323. 1958; Moldenke, Résumé 70 & 442. 1959.

Collectors report that this plant is a shrub with white flowers, occasional in talus forests, at altitudes of 1300 to 1500 meters, blooming in January. The type was collected in an uppermost slope forest at an elevation of 1500 to 1700 meters.

Citations: VENEZUELA: Amazonas: Maguire, Wurdack, & Bunting 36952 (N--type); Maguire, Wurdack, & Bunting 42582 (N).

AEGIPHILA VERRUCOSA Schau.

Literature: Roem. & Schult., Syst. Veg., ed. 1, 4: 698 (1819) and ed. 2, 2: 82. 1820; Schau. in A. DC., Prodr. 11: 650. 1847; Karst., Ausw. Neu. Schön. Blüt. Gew. Venez. 31—33, pl. 10. 1848; Bocq., Adansonia 3: 188. 1862; Benth. in Benth. & Hook. f., Gen. Pl. 2: 1151. 1876; Jacks., Ind. Kew. 1: 47 & 345. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 166. 1895; Pittier, Pl. Usual. Venez. 416. 1926; Moldenke, Brittonia 1: 258—260, 263, 285—289, 472, 474, & 475. 1934; Moldenke, Phytologia 1: 272. 1937; Moldenke, Alph. List Common Names 8. 1939; Moldenke, Geogr. Distrib. Avicenn. 20. 1939; Moldenke, Prelim. Alph. List Invalid Names 8 & 32. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 85. 1942; Moldenke, Alph. List Invalid Names 4, 7, & 33. 1942; Moldenke, Phytologia 2: 91. 1944; Moldenke, Alph. List Cit. 1: 7 & 198 (1946) and 2: 337, 580, & 603. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 51. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 62 & 175. 1949; Moldenke, Alph. List Cit. 3: 694, 749, 819, & 974 (1949) and 4: 1035 & 1049. 1949; Moldenke, Résumé 65, 70, 239, 240, 319, & 442. 1959.

Illustrations: Karst., Ausw. Neu. Schön. Blüt. Gew. Venez. pl. 10. 1848.

The wood of this species is reported to be white, and the species is said to grow at 2400 meters altitude. It has been misidentified in herbaria as Metteniusa sp.

Additional citations: VENEZUELA: Mérida: Bernardi 6087 (N).

AEGIPHILA VERTICILLATA Vell.

Additional synonymy: Aegiphila veryicillata Vell. ex Moldenke, Alph. List Cit. 1: 171, sphalm (1946) and 3: 670, sphalm. 1949.

Additional and emended literature: Jacks., Ind. Kew. 1: 47. 1893; Moldenke, Brittonia 1: 252, 266, 267, 284, 297, 300, 329—331, 334, 344—346, & 472—477. 1934; Moldenke, Geogr. Distrib. Avicenn. 25 & 28. 1939; Moldenke, Prelim. Alph. List Invalid Names 2—4. 1940; Moldenke, Suppl. List Invalid Names 3. 1941; Moldenke, Alph. List Invalid Names 2, 3, & 24. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 40, & 85. 1942; Moldenke, Alph. List Cit. 1: 56, 78, 90, 94, 106, 107, 121, 127, 170—172, 177, 231, 237, 250, 265, 289, 318, & 326 (1946), 2: 328, 329, 331, 337, 343, 362, 364, 365, 367, 370, 433, 435, 534, 535, 551, 553, 598, & 933 (1948), 3: 663, 670, 674, 675, 690, 692, 710, 711, 751, 814, 816, 838, 844—846, 855, 856, 858, 890, 915, 921, & 922 (1949), and 4: 1046, 1058, 1081, 1087, 1106, 1123, 1124, & 1301. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75, 98, & 175. 1949; Moldenke, Phytologia 4: 434. 1953; Moldenke, Résumé 86, 115, 229, 231, 284, & 442. 1959; Angely, Ind. Ang. 10. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 149. 1960; Angely, Fl. Paran. 16: 36. 1960.

Additional citations: BRAZIL: Minas Gerais: Macedo 434 (S). Paraná: Hatschbach 3757 (Z). São Paulo: Brade 13095 [Herb.

Jard. Bot. Rio Jan. 29513] (B).

AEGIPHILA VILLOSA (Aubl.) Gmel.

Additional and emended literature: Jacks., Ind. Kew. 1: 47 (1893) and 2: 160. 1894; Moldenke, Brittonia 1: 259, 260, 268, 280, 339, 342--345, & 474--476. 1934; Moldenke, Alph. List Common Names 6, 22, & 33. 1939; Moldenke, Geogr. Distrib. Avicenn. 21 & 25. 1939; Moldenke, Prelim. Alph. List Invalid Names 4 & 32. 1940; Moldenke in Pulle, Fl. Surin. 4 (2): 304. 1940; Moldenke, Alph. List Invalid Names 3 & 33. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 36, & 85. 1942; Moldenke, Alph. List Cit. 1: 15, 37, 113, 114, 274, & 318 (1946), 2: 445, 582, 624, 631, & 640 (1948), 3: 655, 709, 724, 810, 825, 853, & 888 (1949), and 4: 1046 & 1097. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 65, 68, 75, & 175. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 2. 1949; Moldenke, Phytologia 4: 431 & 435--437. 1953; Moldenke, Résumé 74, 78, 86, 231, 319, & 442. 1959.

Cowan reports that this is a tree 6 meters tall, fruiting in November, found in the primary forest at altitudes of 70 to 300 meters.

Additional citations: BRAZIL: Amapá: Cowan 38260 (N); Fróes & Black 27481 (Z).

AEGIPHILA VILLOSISSIMA Moldenke

Literature: Moldenke, Bull. Torrey Bot. Club 60: 392. 1933; J. A. Clark, Card Ind. Gray Herb. 1933; Moldenke, Brittonia 1: 252, 254, 259, 277, 442--443, & 474. 1934; Moldenke, Phytologia 1: 296. 1938; Moldenke, Geogr. Distrib. Avicenn. 25. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36 & 85. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 46. 1948; Moldenke, Alph. List Cit. 2: 621. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75 & 175. 1949; Moldenke, Résumé 86 & 442. 1959; Angely, Ind. Ang. 10. 1959.

AEGIPHILA VIRGATA Turcz.

This name, accepted by me as doubtfully valid in Brittonia 1: 469 & 475 (1934), Geogr. Distrib. Avicenn. 25 (1939), and Alph. List Cit. 3: 737 (1949), has proved to belong in the synonymy of Arrabidaea corchorioides (Cham.) P. DC. in the Bignoniaceae.

AEGIPHILA VITELLINIFLORA Klotzsch

Additional and emended literature: Jacks., Ind. Kew. 1: 46 & 47. 1893; Moldenke, Brittonia 1: 259, 279, 421—426, 449, & 471--476. 1934; Moldenke, Alph. List Common Names 7 & 12. 1939; Moldenke, Geogr. Distrib. Avicenn. 25, 28, & 35. 1939; Moldenke, Prelim. Alph. List Invalid Names 1, 4, & 24. 1940; Moldenke, Alph. List Invalid Names 1 & 23. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 36, 39, 40, 70, & 85. 1942; Moldenke, Alph. List Cit. 1: 30, 44, 54, 78, 107, 114, 135, 164, 224, 226, 236, 237, 263, 264, 284, 325, & 326 (1946), 2: 329, 331,

336, 361, 414, 432, 485, 530, & 561 (1948), 3: 684, 686, 710, 726, 736, 801, 814, 838, 856, 879, 907, 911, 920, & 922 (1949), and 4: 982, 1086, 1106, 1113, & 1254. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 75, 96, 98, 156, & 175. 1949; Moldenke, Phytologia 4: 437—438. 1953; Moldenke, Résumé 86, 113, 115, 212, 228, 231, 278, 415, & 442. 1959; Angely, Ind. Ang. 10. 1959.

Additional citations: BRAZIL: Bahia: Blanchet 904/1294 (N), 3269 (N). Pará: Murça Pires 3662 (Z).

AEGIPHILA WIGANDIOIDES Lundell

Additional and emended literature: Moldenke, Alph. List Cit. 3: 715. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 28 & 175. 1949; Moldenke, Phytologia 4: 438. 1953; Moldenke, Résumé 34 & 442. 1959.

Additional citations: MEXICO: Chiapas: Matuda 4253 (Mi—type, W—1891341—isotype).

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ADDITIONAL NOTES ON THE GENUS VITEX. I

Harold N. Moldenke

These notes are supplementary to the information given in my monograph of the genus as published in preliminary form in Phytologia 5: 142—176, 186—224, 257—280, 293—336, 343—393, 404—464, & 465—507 and 6: 13—64, 70—128, 129—192, & 197—231 in the period of 1955 to 1958.

VITEX Tourn.

Additional synonymy: Vitee L. ex Moldenke, Alph. List Cit. 3: 849, sphalm. 1949.

Additional and emended literature: A. Cunn., Precur. no. 390. 1838; Hassk., 2e Cat. Lands Pl. Tuin Buitenz. 134—136. 1844; Walp., Repert. 4: 84—92. 1845; A. Cunn., Raoul Choix 44. 1846; Hook. f., Fl. Nov. Zel. 1: 203. 1853; Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 257. 1857; Hook. f., Handb. N. Z. Fl. 223. 1864; Miq., Ann. Mus. Bot. Lugd.-Bat. 2: 99. 1865; Roxb., Fl. Ind., repr. ed. Carey, 476. 1874; F. Muell., Descr. Not. Pap. Pl. 1: 11. 1875—1876; Loret & Barrandon, Fl. Montpel. 532—533 & 918. 1876; Fern.-Vill. in Blanco, Fl. Filip., ed. 3, Nov. App. 160. 1880; Forbes, Nat. Wand. East. Arch. 514. 1885; Campbell & Watt, Descript. Cat. Econom. Prod. Chutia Nagpur 39 & 55. 1886; Moloney, Sketch Forest. W. Afr. 523 & 524. 1887; Schum. & Hollrung, Fl. Kais. Wilhelmsland 121. 1889; Durand & DeWild., Bull. Soc. Roy. Bot. Belg. Compt. Rend. 38: 133—134. 1899; Warb. in Engl., Bot. Jahrb. 13: 428. 1891; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 523—524. 1900; Cheesem., Man. New Zeal. Fl., ed. 1, 565. 1906; Laing & Black-

well, Pl. New Zeal., ed. 1, 350—351, fig. 114. 1906; Valet., Bull. Dept. Agric. Ind. Néerl. 10: 51—53. 1907; Sim, For. Fl. Cape Colony 286—287, pl. 120. 1907; Pulle in Lorentz, Nova Guinea 8 (4): 685. 1912; Cockayne, Distrib. Veg. Fl. New Zeal. 14. 1919; Bridel, Bull. Soc. Chim. Biol. 3: 722. 1923; E. D. Merr., Enum. Philipp. Flow. Pl. 3: 394—398. 1923; Setchell, Carnegie Inst. Wash. Publ. 341 [Dept. Marine Biol. 20]: 55. 1924; Cheesem., Man. New Zeal. Fl., ed. 2, 763—765. 1925; Laing & Blackwell, Pl. New Zeal., ed. 3, 354—356, fig. 127. 1927; Crevost & Pételot, Bull. Econom. Indo-chine 39: 1297. 1934; Moldenke, Brief Course Syst. Bot. Lect. 1, rev., 5. 1938; Moldenke, Brief Course Syst. Bot., ed. 2, 7. 1939; Oppenheimer & Evenari, Bull. Soc. Bot. Genev. 31: 363. 1940; Laing & Blackwell, Pl. New Zeal., ed. 4, 372—373, fig. 139. 1940; Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; A. R. Schultz, Introd. Estud. Bot. Sist., ed. 2, 484, 519, & 562. 1943; E. L. D. Seymour, New Gard. Encycl. 1292. 1944; Karrer & Schmid, Helv. Chim. Act. 29: 525. 1946; Holdridge & al., Forests West & Cent. Ecuador 23, 25, 46, & 67. 1947; Moldenke, Alph. List Cit. 3: 849. 1949; Sevim, Orman Fakult. Dergisi Istanb. Univ. 2 (2): 40. 1952; Briggs & Cain, Chem. Soc. Lond. 4: 4182. 1954; Mohr, Deutsch. Med. Wschr. 79: 1513. 1954; Probst & Roth, Deutsch. Med. Wschr. 79: 1271. 1954; Aristeguieta, Clave & Descript. Fam. Arb. Venez. 192, 193, 209, 232, 236, & 306. 1954; Hansford, Reinwardtia 3: 75—112. 1954; Castañeda, Caldasia 7: 49—50. 1955; Cavaco, Bull. Mus. Nat. Hist. Nat. Paris, sér. 2, 27: 91. 1955; Ikeda, Journ. Jap. Forest. Soc. 37: 334—335. 1955; Moldenke, Phytologia 5: 343—393 & 404—464. 1956; Revist. Sudam. Bot. 10: 260. 1956; Assoc. Etud. Fl. Afr. Trop. Index 1955: 63. 1956; Moldenke, Biol. Abstr. 30: 243—344, 1418, 1704, & 3551. 1956; Satoo, Biol. Abstr. 30: 2695. 1956; Cavaco, Biol. Abstr. 30: 1703. 1956; Biol. Abstr. 29: 3602 & 3630. 1957; Van Steenis, Fl. Males. Bull. 2: 302, 474, 529, & xlii. 1957; Benson, Pl. Classif. 227. 1957; Santapau, Fl. Purandhar 103—104. 1957; Alain in León & Alain, Fl. Cuba 4: 280 & 316—318. 1957; Moldenke in Steyermark, Fieldiana 28: 1082. 1957; Angely, Fl. Paran. 11: 22 & 31. 1957; Veloso & Klein, Sellowia 8: 182, 186, & 220. 1957; E. H. Walker, Proc. 8th Pacif. Sci. Cong. 4: 402. 1957; Moldenke, Phytologia 5: 465—507 (1957), 6: 13—64 & 70—128 (1957), and 6: 129—192, 197—231, & 332. 1958; Assoc. Etud. Tax. Fl. Afr. Trop. Index 1957: 61. 1958; Cavaco, Mem. Soc. Broter. 13: 74. 1958; Biol. Abstr. 30: 4370 & 4398. 1958; Alain, Revist. Soc. Cub. Bot. 15: 47. 1958; Moldenke, Am. Midl. Nat. 59: 365—366. 1958; Lombardo, Arb. Cult. Pas. Pub. 255—256. 1958; Brizicky, Stern, & Chambers, Trop. Woods 109: 79. 1958; Assoc. Etud. Tax. Fl. Afr. Trop. Index 1958: 64. 1959; Razi, Rec. Bot. Surv. India 18: 55. 1959; B. Price, New York Herald Trib., sect. 4, p. 10, June 7. 1959; Moldenke, Phytologia 7: 85. 1959; Hänsel & Winde, Arzneim.-Forsch. [Drug Res.] 9: 189—190. 1959; Moldenke, Résumé 232, 233, 248, 250, 251, 276, 285, 302, 309, 319, 321, 335, 341, 342, 355, 356, 379, 393, 395—399, 409, 424, & 474. 1959; Moldenke, Résumé Suppl. 1: 5, 7—13, 15, 23, & 25. 1959; Reitz, Sellowia

11: 135. 1959; Veloso & Klein, Sellowia 11 (10): 99 & 105. 1959; Miranda, Anal. Inst. Biol. Mex. 30: 147. 1959; Menninger, 1960 Price List Flow. Trees [10]. 1960; Assoc. Etud. Tax. Fl. Afr. Trop. Index 1959: 53. 1960; Winde & Hänsel, Arch. Pharm. 293/65: 556—567. 1960; Rennó, Levant. Herb. Inst. Agron. Minas 151. 1960; Angely, Fl. Paran. 16: 80. 1960; A. R. Schultz, Inst. Tec. Rio Grande do Sul Pub. 30: 15. 1960; Angely, Fl. Paran. 15: 12 & 24. 1960; Angely, Liv. Gen. Bot. Bras. 35 & 58. 1960; Angely, Fl. Paran. 17: 47. 1961; Menninger, Trop. Tree Seeds [2]. 1961; Tel-Aviv Univ. Ind. Sem. 1960: 3. 1961; Kelsey Nursery Service, Short Guide Cat. 167: 33. 1961.

Additional excluded species: Vitex americana L. = Buddleja americana L., Loganiaceae; Vitex lanceolata Turcz. = Psychotria sarmentosa Blume, Rubiaceae.

This is a diverse genus of about 380 known specific and subspecific entities, mostly native to the tropics and subtropics of both the Eastern and Western Hemispheres; a few also found in the temperate portions of Europe, Asia, and South Africa. At least 56 kinds are cultivated, of which the Mediterranean V. agnus-castus and the Asiatic V. negundo are the most commonly seen, each existing in several popular horticultural varieties. Both occasionally escape from cultivation and become naturalized in areas far removed from their original home. Five species are known in the fossil condition from Cretaceous to Recent formations in Europe and the Cameroons.

The generic name is derived from the Latin, vieo, to bind, as with osier twigs, in reference to the flexibility of the shoots of the type species, V. agnus-castus, and was apparently first applied by Hieronymus Bock in 1552. Earlier, Pliny, Dioscorides, and Homer used the name Agnos, or its Greek equivalent, for these plants. Members of the genus are now commonly referred to in English as "chaste-trees", in French as "gattilier", in German as "Keuschbaum", and throughout most of South America as "taruma". Aristeguieta, in the reference cited above, lists the common names "aceituno", "escobillo", "guarataro", and "totumillo" for members of the genus in Venezuela.

Members of the group are mostly trees or shrubs, very rarely woody vines, with opposite or ternate, mostly palmately compound leaves of 1—7 leaflets, and cymose, axillary or terminal, usually racemiform or thyrsoid to laxly diffuse panicles of blue, violet, yellowish, or white mint-like flowers, rarely solitary or contracted to form heads. An Amazonian species is said to grow to a height of 200 feet. Certaun species have been and are still used medicinally or ceremonially by the natives in various lands. A group of Madagascar species with very large tubular flowers and a more or less dome-shaped upper lip, is sometimes segregated as the separate genus Chrysomallum. On the other hand, the Asiatic genera Teijsmanniodendron and Viticipremna and the West Indian genus Pseudocarpidium were formerly included in Vitex.

The Hinton 16235 and Loveless 2774, both distributed as species

of Vitex, are not verbenaceous, while Peter 13705, distributed as Vitex gomphophylla Baker, is actually Combretum brosigianum Engl. & Diels. in the Combretaceae.

VITEX ACUMINATA R. Br.

This is described by Mrs. Clemens as a medium-sized tree, growing among mangroves on the bank of a canal. It has been collected in anthesis in December and in fruit in December and February. Herbarium specimens have sometimes been misidemtified as V. glabrata F. Muell.

Additional citations: AUSTRALIA: Queensland: M. S. Clemens s. n. [1 December 1946] (Mi), s.n. [1 December 1947] (Ca--81173), s. n. [9 November 1948] (Mi); Mrs. R. L. Higgins s.n. [near Rockhampton, 2/1922] (Ca--226265); Kajewski s.n. [Gympie, Decr. 1922] (Ca--314411); C. T. White 1423 (Ca--226203).

VITEX AGNUS-CASTUS L.

Additional synonymy: Vitee agnus-castus L. ex Moldenke, Alph. List Cit. 3: 849, sphalm. 1949.

Additional literature: Griseb., Abhand. Königg. Gesell. Wissen. Götting. 7: 257. 1857; Loret & Barrandon, Fl. Montpel. 532--533 & 918. 1876; Bridel, Bull. Soc. Chim. Biol. 3: 722. 1923; Moldenke, Brief Course Syst. Bot. Lect. 1, rev., 5. 1938; Moldenke, Brief Course Syst. Bot., ed. 2, 7. 1939; Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; E. L. D. Seymour, New Gard. Encycl. 1292. 1944; Karrer & Schmid, Helv. Chim. Act. 29: 525. 1946; Sevim, Orman Fakult. Dergisi Istanb. Univ. 2 (2): 40. 1952; Briggs & Cain. Chem. Soc. Lond. 4: 4182. 1954; Mohr, Deutsch. Med. Wschr. 79: 1513. 1954; Probst & Roth, Deutsch. Med. Wschr. 79: 1271. 1954; Moldenke, Phytologia 5: 149, 150, & 186--196 (1955) & 5: 353 & 404. 1956; Moldenke, Biol. Abstr. 30: 1704. 1956; Moldenke, Phytologia 5: 465, 491--494 & 504 (1957) and 6: 17. 1957; Moldenke, Am. Midl. Nat. 59: 365. 1958; Price, New York Herand Trib., sect. 4, p. 10, June 7. 1959; Hänsel & Winde, Arzneim.-Forsch. [Drug Res.] 9: 189--190. 1959; Moldenke, Résumé 8, 10--12, 14, 15, 23, 24, 26, 30, 31, 57, 59--62, 76, 77, 111, 128--132, 151, 154, 158, 159, 172, 191, 225, 232, 284, 335, 379--384, 386, 388, 389, 391, 419, 420, 426, & 475. 1959; Moldenke, Résumé Suppl. 1: 8. 1959.

The species is said to grow along roadsides at Macon, Georgia, and in talus in Spain. Waby found it growing to be a tree in Turner's Hall woods, Barbados, but misidentified it as a species of Inga (Mimosaceae). Dempster says that it grows in hilly country in Epirus, while Balls found it on dark volcanic sandy soil by seashores in Turkey. Allard 11391, cited below, bears no indication on its label that it is from a cultivated plant, but I am assuming that it is. McAfee found the species growing in sandy loam soil in Oklahoma, flowering in October.

Balls describes the plant as a lax shrub to 15 feet tall and spreading by underground runners, the inflorescences 6--12 in-

ches long, flowering in August, the flowers "in shades of pale-lilac or lavender-blue, each bush a separate color." Dempster says that the flowers vary from "dark-purple to nearly white", Allard calls them "purplish" or "blue-purple", while Chiao describes them as "blue, with offensive odor". Allard found the plant blossoming in July.

The Stefani s.n. [10 Mai 1903] from Corsica, distributed as this species in the herbarium of the University of California, is not verbenaceous -- it probably represents a case of transposed labels. The Mori s.n. [Agosto 1933] (Ew) cited by me on page 175 of Phytologia, volume 5 (1955) as from Italy, is actually from a cultivated plant and should be shifted to the "CULTIVATED" section of the citations. Hänsel & Winde, in the reference cited above, describe a new glycoside, which they call "agnosid" or "agnoside", from Vitex agnus-castus. It is said to be a pseudoindicane and possesses the formula $C_{22}H_{26}O_{11}$, with a molecular weight of 466.43. In the crystalline form it melts at 146° C. It is the ester of p-oxy-benzoic acid with aucubine.

Additional citations: GEORGIA: Bibb Co.: Biltmore Herb. 1786a (S). Decatur Co.: Curtiss 6813, in part (Ur). FLORIDA: Santa Rosa Co.: Curtiss 6813, in part (Ur). ALABAMA: Lee Co.: Earle & Baker s.n. [Auburn, 10/9/1898] (Dt). OKLAHOMA: Payne Co.:McAfee 85 (Ca--882863); W. L. Spears s.n. [July 10, 1935] (Um--179). TEXAS: Travis Co.: Harpin, Waldorf, & Barkley 13081 (Ca--882862, Ok). WINDWARD ISLANDS: Barbados: Waby 105 (Bm). FRANCE: Albert s.n. [Magnier 1261] (Um--177); Autheman 5467 (Um--178); Despaty s.n. [Duffour 1871] (Vi); Hérail s.n. (Um--180); Monnier s.n. [1832] (Vi); F. Schultz 1207 (B); Théoeneau s.n. [Juli 1868] (B); Tholin s.n. [22 Julii '82] (B). SPAIN: Sennen 429 (S), s.n. [Duffour 1871 bis] (Um--176). GREECE: Cyrén s.n. [Agrinion, 15/6/1934] (Go); L. Dempster 2467 (Ca--179808); Engelhardt s.n. [3.8.1904] (B), s.n. [23.8.1904] (B); Heldreich 599 (B); Mattfeld 2035 (Ca--347616). AEGEAN ISLANDS: Samos: B. Brown s.n. [June & July, 1924] (Ca--986781). ITALY: Bigo s.n. [18/8/1871] (B). CYPRUS: H. Lindberg s.n. [22.7.1939] (Go). SICILY: H. Ross 865 (B). CORSICA: O. Debeaux 62 (B). CRETE: E. H. L. Krause 16803 (B); E. Reverchon 185 (B). JUGOSLAVIA: Dalmatia: M. Burret 342 (B), 373 (B); O. Krebs s.n. [Junio 1901] (B). Fiume: Noé 138 (B). Herzegovinia: Engelhardt s.n. [31/VIII/1900] (B). Istria: Engelhardt s.n. [2/8/1909] (B). Trieste: Hrouven s.n. [14/7/1889] (B); Vatoda s.n. [9.VIII.1921] (Um--171, Vi). BULGARIA: Dingler s.n. [bei Dedeaghatsch] (B). MOROCCO: Quer 545 (Ca--464877). ALGERIA: E. Reverchon 66063 (Vi). TURKEY: Balls 565 (Ca--79895); Borrmüller 1236 (B, B); Callier 171 (B, B); Halácsy 1437 (B); B. Post s.n. [Aug. 11, 1935] (Dt). ISRAEL: Field & Lazar 233 (Ca--583318, Ca--620197). CULTIVATED: Brazil: G. A.

Black 48-3635 (Ca—72808). California: W. R. Dudley s.n. [July 1895] (Du—362565). China: Chiao 52 [Herb. Univ. Nanking 10476] (Ca—281054). Florida: McFarlin 5571 (Mi). Germany: Baenitz s.n. [15.9.1910] (B); Rettig s.n. [Koehne 321] (B). Kansas: Gates 15025 (Um—167). North Carolina: Biltmore Herb. 1786 [July 27th] (S), 1786 [September 27th] (S). Oklahoma: Felkner 10 (Ok—27413); "M. V. H." 93 (Ok); Hopkins, Nelson, & Nelson 654 (Ok). Texas: Knobloch 187 (Ok); Tharp s.n. [Austin, 8/20/41] (Ca—882866, Vi). Virginia: H. A. Allard 11391 (Ca—793723), 20670 (We).

VITEX AGNUS-CASTUS f. ALBA (West.) Rehd.

Additional synonymy: Vitex agnus-castus f. albiflorus Carr., in herb.

Additional literature: Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; E. L. D. Seymour, New Gard. Encycl. 1292. 1944; Moldenke, Phytologia 5: 189 (1955) and 5: 353. 1956; Moldenke, Résumé 14, 30, 131, 158, 225, 232, 379, 380, 383, 425, 426, & 475. 1959; Moldenke, Résumé Suppl. 1: 8. 1959.

Additional citations: SPAIN: A. Peter 45229 [V.362] (B). ITALY: Frank s.n. [Messina, Julio 1882] (B).

VITEX AGNUS-CASTUS f. LATIFOLIA (Mill.) Rehd.

Additional literature: Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; E. L. D. Seymour, New Gard. Encycl. 1292. 1944; Moldenke, Phytologia 5: 190—193, 196, & 259 (1955), 5: 353 (1956), and 5: 465. 1957; Lombardo, Arb. Cult. Pas. Pub. 47 & 255. 1958; Moldenke, Résumé 130—132, 158, 225, 227, 232, 379, 380, 385—387, 390, 427, & 475. 1959; Menninger, 1960 Price List Flow. Trees [10]. 1960; Kelsey Nursery Service, Short Guide Cat. 167: 33. 1961.

Additional illustrations: Lombardo, Arb. Cult. Pas. Pub. 255. 1958.

The Schulz & Schulz s.n. specimen cited below has most of its leaflets split at the base into a long lateral lobe. The Kelsey reference cited above describes the form as growing to 6 feet tall, with showy blue flowers from July to frost, growing well in sun and in acid soil, called "chaste tree"; 18—24-inch plants are offered for $1.50 each or two for $2.50.

Additional citations: MOROCCO: Quer 545 (B). IRAN: Bornmüller 645 (B). CULTIVATED: Germany: Bornmüller s.n. [1878—1882] (B); Schulz & Schulz s.n. [24.9.1897] (B). Jamaica: G. R. Proctor 11205 (Bm). New York: H. N. Moldenke 21251 (Bs, Mm, Ok, Sm), 21572 (Sm). Virginia: H. A. Allard 11391 (Gg—381232).

VITEX AGNUS-CASTUS f. ROSEA Rehd.

Additional synonymy: Vitex agnus-castus var. rosea Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941.

Additional literature: Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; Moldenke, Phytologia 5: 195—196. 1955; Moldenke, Résumé 131, 225, 386, 426, & 475. 1959; Moldenke, Résume Suppl. 1: 8 & 23. 1959.

Additional citations: JUGOSLAVIA: Dalmatia: Brunnelle s.n. [5/7/1886] (B).

VITEX AGNUS-CASTUS var. CAERULEA Rehd.

Additional literature: Moldenke, Phytologia 5: 190. 1955; Moldenke, Résumé 24, 30, 120, 131, 225, 379, 380, 383, 426, & 475. 1959; Moldenke, Résumé Suppl. 1: 8. 1959.

The Heldreich 599 collection cited below is inscribed "floribus coeruleis et carneis" so may represent a mixture of this variety and of f. rosea Rehd.

Additional citations: GREECE: Heldreich 599 (B). JUGOSLAVIA: Dalmatia: Brunnelle 2014 (B). CULTIVATED: North Carolina: P. O. Schallert 351 (Ok), s.n. [June 20, 1941] (Ca--882865).

VITEX AGNUS-CASTUS var. PSEUDO-NEGUNDO Hausskn.

Additional literature: Moldenke, Phytologia 5: 193--195. 1955; Moldenke, Am. Midl. Nat. 59: 365--366. 1958; Moldenke, Résumé 132, 158, 159, 379, 384, 388, 427, & 475. 1959; Moldenke, Résumé Suppl. 1: 11. 1959; Razi, Rec. Bot. Surv. India 18: 55. 1959; Tel-Aviv Univ. Ind. Sem. 1960: 3. 1961.

The Gabriels, on the label of the specimen cited below, claim that V. hausknechtii Borrm. is identical with this variety.

Additional citations: UNION OF SOCIALIST SOVIET REPUBLICS: Turkmanskaya: Borrmtller 917 (B). JORDAN: Kneucker 430 (B). IRAQ: Field & Lazar 735 (Ca--620082), 818 (Ca--620076). IRAN: Borrmtller 5128 (B); Gauba 902 (B); Rechinger & Rechinger 5778 (Ca--42740); T. Strauss s.n. [Juli 1897] (B). AFGHANISTAN: Gabriel & Gabriel 3 (B). BALUCHISTAN: Rechinger, Rechinger, Aellen, & Esfandiari 3996 (Ca--42739). PAKISTAN: Sind: Stapf s.n. [13/VII/85] (B).

VITEX AGNUS-CASTUS var. SERRATA Moldenke

Additional literature: Moldenke, Phytologia 5: 196. 1955; Moldenke, Résumé 225, 232, 385, & 475. 1959.

The Petry specimen cited below shows ten serrate leaflets.

Additional citations: CULTIVATED: France: Petry s.n. [Septbr. 1900] (B).

VITEX AJUGAEFLORA Dop

Additional literature: Moldenke, Phytologia 5: 353. 1956; Moldenke, Résumé 177, 225, 380, & 475. 1959.

Pierre describes this as a tree 20 to 30 meters tall, flowering in June, and called "binh linh nge". It seems to be very closely related to V. peduncularis Wall. and may actually be conspecific with it. It has been collected in fruit in June.

Additional citations: INDOCHINA: Annam: Poilane 6844 (B--cotype). Cochinchina: Pierre 24 [Bois 24] (B), 1509 (Ca--54869--cotype), s.n. [Gia Pau me, 9/1865] (Ca--54870), s.n. [10/1866] (B); Poilane 40764 (B). CULTIVATED: Indochina: Pierre 1509 (B--cotype).

VITEX ALTISSIMA L. f.

Additional literature: Campbell & Watt, Descript. Cat. Econom. Prod. Chutia Nagpur 55. 1886; Moldenke, Phytologia 5: 197—202 (1955), 5: 354—355 (1956), 5: 465 (1957), and 6: 13. 1957; Moldenke, Résumé 159, 164, 167, 177, 188, 191, 202, 225, 319, 380, 381, 385, 388—390, & 475. 1959.

Campbell & Watt, in the reference cited above, record the vernacular names "bhadu" and "marak". They state that the wood is good for the manufacture of yokes, and that the bark is applied externally in the treatment of chest pains in India. The species has been collected at 3000 feet altitude in Madras.

The Menninger material cited below illustrates the dimorphic character of the leaves of this species. The flowering branches exhibit hardly any wings on the petioles, but the non-flowering branches have conspicuous wings. Menninger reports that the two kinds of branches grow side by side on the tree.

The Herb. Lemmon s.n. [Mangalor, Canara] in the herbarium of the University of California, determined as this species, is not verbenaceous.

Additional citations: PAKISTAN: East Bengal: Griffith 6066 ["Hk. and Bth. no. 11"] (Ut—11518). INDIA: Bombay: Hohenacker 115 (B), s.n. [Prope urbem Mangalor] (B). Madras: Yeshoda 184 (B). State undetermined: R. Wight 2325 (B). CULTIVATED: Florida: Menninger s.n. [Moldenke 21678] (Bs, Ok).

VITEX ALTMANNI Moldenke

Additional literature: Moldenke, Phytologia 5: 203. 1955; Moldenke, Résumé 191, 196, & 475. 1959.

This plant has been misidentified in herbaria as V. parviflora A. L. Juss.

Additional citations: PHILIPPINE ISLANDS: Luzon: Loher s.n. [Rizal Province] (Ca—229199).

VITEX AMANIENSIS Pieper

Additional literature: Moldenke, Phytologia 5: 203—204. 1955; Moldenke, Résumé 145 & 475. 1959.

Collectors describe this species as a tree, 8 feet tall, with a single stem and mauve aromatic flowers, blooming in October, growing in groups in rich brown soil in thickets at altitudes of 33 to 800 meters. Tanner reports the common name "mnegege" and says that the roots are boiled and the resulting liquid drunk in the treatment of sharp pains in the stomach. It has been misidentified in herbaria as V. amboniensis Gürke.

Citations: TANGANYIKA: A. Peter 3659 [O.I.105] (B, Z); Tanner 3315 (Ba).

VITEX AMBONIENSIS Gürke

Additional literature: Moldenke, Phytologia 5: 355 (1956) and 5: 465. 1957; Moldenke, Résumé 143, 145, 148, 151, 154, & 475. 1959.

Peter describes this plant as a shrub 3 meters tall or a tree

6 meters tall, with pink flowers, blossoming in June. He found it in fruit in January, February, and June, growing at altitudes of 250 to 1180 meters. The Tanner 3315 distributed as this species is V. amaniensis Pieper.

Additional citations: TANGANYIKA: Engler s.n. [7.II.1905] (B); A. Peter 21267 [O.IV.202] (B), 22531 [O.IV.255] (B), 23015 [O.IV.279] (B), 23801 [O.IV.313] (B, B), 35068 [V.127] (B), 35486 [V.135] (B), 35642 [V.136] (B), 35700 [V.137] (B), 36020 [V.142] (B).

VITEX AMBONIENSIS var. AMANIENSIS Pieper

Additional literature: Moldenke, Phytologia 5: 206. 1955; Moldenke, Résumé 145 & 475. 1959.

Citations: TANGANYIKA: Herb. Inst. Amani 221 (B).

VITEX BENTHAMIANA Domin

Additional literature: Moldenke, Phytologia 5: 355. 1956; Moldenke, Résumé 211, 390, & 475. 1959.

The original description of Bentham's V. trifolia var. parviflora is "erect; leaflets 5 or sometimes 3, ovate or ovate-lanceolate, acute; flowers much smaller; resembling V. Negundo from which it is scarcely distinguishable."

VITEX BREVILABIATA Ducke

Additional literature: Moldenke, Phytologia 5: 218—220. 1955; Moldenke, Am. Midl. Nat. 59: 365. 1958; Moldenke, Résumé 111 & 475. 1959.

Coelho describes the flowers of this plant as rose-colored, blooming in August.

Additional citations: BRAZIL: Amazonas: Coelho s.n. [Herb. Inst. Nac. Pesq. Amaz. 4024] (Bs), s.n. [Herb. Inst. Nac. Pesq. Amaz. 5729] (Z).

VITEX BUCHANANII J. G. Baker

Additional literature: Moldenke, Phytologia 5: 220—221. 1955; Moldenke, Résumé 145, 150, 151, 381, & 475. 1959.

Additional citations: TANGANYIKA: Schlieben 1614 (B).

VITEX BUCHANANII var. QUADRANGULA (Gürke) Pieper

Additional literature: Moldenke, Phytologia 5: 221. 1955; Moldenke, Résumé 145, 150, 381, 388, & 475. 1959.

Additional citations: BRITISH NYASALAND: Stolz 512 (B).

VITEX BULUSANENSIS Elm.

Additional and emended literature: Elm., Leafl. Philipp. Bot. 10: 3798—3799. 1939; Moldenke, Phytologia 5: 223. 1955; Moldenke, Résumé 185 & 475. 1959.

A small suberect tree; trunk 3 dm. in diameter 8 m. high, subterete, branched chiefly toward the top; wood very hard and brittle, dull-brown except the thin dingy- or yellowish-white sapwood; bark smoothish, gray, melleous except the epidermis;

branchlets ascending, rigid, breaking with a snap, gray, glabrous, the young twig portion covered with a ferrufinous pubescence which soon wears off with age; leaves not numerous, opposite, terminal or laterally scattered; petioles stout, 8 cm. long, terete, ferruginous, swollen at the base and leaving large obconic scars after falling, blackish-brown when dry, thickened at the distal end; leaflets 6, diverse in size, the central blade 12 cm. wide across the middle or widest portion, 26 cm. long, the lower blades 10 cm. long and 5 cm. wide or even less, all elliptic-oblong, horizontally spreading, subchartaceous, entire, shallowly folded upon the upper sublucid surface, obtuse at the base, mostly acute and recurved at the apex, only slightly paler green beneath, curing nearly equally tan-brown on both surfaces, glabrous; midrib pronounced beneath and dark-brown, plane above or canaliculate toward the base; secondaries 5—15 (depending on the size of the leaflet), conspicuous, ascending, subparallel, the tips reticulately united or anastomosing, the primary reticulations coarse, the ultimate ones very fine; petiolules 1.5—4 cm. long, radially spreading, strict, yellowish-brown-pubescent especially at their thickened bases, relatively stout, canaliculate on the upper surface; flowers not known; infructescence erect or suberect, terminal or axillary, about as long as the subtending leaf, sparingly paniculately branched, 1—3 dm. long, branched from below the middle, ferruginous when young, glabrous in age and curing blackish-brown; fruiting-calyx sessile or subsessile, broadly turbinate, yellowish-brown-pubescent on the outer surface, scattered along the slender rachis, subtended by minute bractlets, pale-green when fresh; fruit black, shiny, subglaucous, ellipsoid, 1.5 cm. long, longitudinally striate.

The type of this species was collected by Adolph Daniel Edward Elmer (no. 17004) in secondary woods, at an altitude of 1750 feet, at Irosin, Mount Bulusan, in the province of Sorsogon, Luzon, Philippines, in August, 1916. It is very probable that this is actually a species of Teijsmanniodendron. In fact, Elmer states that it is closely related to Vitex curranii H. J. Lam [=Teijsmanniodendron aherniamum (Merr.) Bakh.], but differs in having its leaflets not so thick-textured and more nervose, with the veinlet reticulation quite evident beneath.

Additional citations: PHILIPPINE ISLANDS: Luzon: Elmer 17004 (Ca—272090—isotype, Um—174—isotype).

VITEX BURMENSIS Moldenke, sp. nov.

Arbor excelsa; foliis 5-foliatis; foliolis ellipticis acuminatis integris, ad basin acuminatis, supra breviter pubescentibus, subtus dense fulvo-pubescentibus; inflorescentiis axillaribus abbreviatis ubique dense pubescentibus.

Tall tree, 10 m. or more in height; branchlets acutely tetragonal, slightly wing-margined, rather densely brown-puberulent, less so in age; twigs very acutely tetragonal and margined, very densely brown-puberulent, sulcate in drying; leaves decussate-opposite, 5-foliolate; petioles slender, 6.5—8.3 cm. long,

densely brown-pubescent; leaflets unequal; petiolules 4—17 mm. long, densely brown-pubescent, flattened and slightly canaliculate above; leaflet-blades membranous, brunnescent in drying, somewhat lighter beneath, elliptic, acuminate at both ends, rather densely short-pubescent above, very densely brown- or fulvous-pubescent beneath, the central one 11—13 cm. long and 4.5—5.3 cm. wide, the rest proportionately smaller; inflorescence axillary, shorter than the petiole, about 7 cm. long, rather loosely many-flowered, cymose, densely brown-pubescent throughout; peduncles slender, flattened, 2.3—3.3 cm. long, usually one long and one shorter one in each axil; pedicels very short, 1 mm. or less in length, densely pubescent; calyx campanulate, about 2 mm. long and wide, densely brown-pubescent on the outside, the rim shallowly dentate; corolla about 7 or 8 mm. long, densely fulvous-pubescent on the outer surface.

The type of this species was collected by R. S. Cooper (no. 5969a) in the mixed forest around Kanpelet Station, Mount Victoria, Burma, on May 27, 1924, and is deposited in the herbarium of the University of California at Berkeley.

Citations: BURMA: Upper Burma: R. S. Cooper 5969a (Ca—170274—type).

VITEX CALOTHYRSA Sandw.

Additional literature: Moldenke, Phytologia 5: 356 & 404. 1956; Moldenke, Biol. Abstr. 30: 1704. 1956; Moldenke, Résumé 74, 111, 387, 415, & 475. 1959; Moldenke, Résumé Suppl. 1: 5. 1959.

Maguire, Wurdack, & Bunting describe this species as a sprawling tree 3—10 m. tall, the corolla blue-purple, its throat yellow, or purple-blue, the lower lip with a yellow spot at its base. Green fruit was present in February. It has been found at altitudes of 100 to 140 meters, and is said to be "occasional" in distribution.

Additional citations: VENEZUELA: Amazonas: Maguire, Wurdack, & Bunting 37402 (N, S), 37413 (N, S); Wurdack & Adderley 43238 (N, S). SURINAM: Lanjouw & Lindeman 2662 (N, Ut—166556). BRAZIL: Amazonas: William s.n. [Herb. Inst. Nac. Pesq. Amaz. 2977] (Z).

VITEX CANESCENS Kurz

Additional literature: Moldenke, Phytologia 5: 259—261 (1955) and 5: 356. 1956; Moldenke, Résumé 164, 166, 171, 174, 177, 178, 381, & 475. 1959.

Recent collectors describe this as a shrub 6 feet tall or a tree 4 m. tall and 90 cm. in trunk circumference, with white, light-yellow, or yellowish-white flowers in August. Green fruit has been collected in February and is described as "bitter". The species is said to be common in mixed deciduous forests and scrub jungles in Thailand. It has been misidentified in herbaria as V. pubescens Vahl.

Additional citations: BURMA: Upper Burma: R. E. Cooper 6107 (Ca—170247). CHINA: Kwangtung: Peng, Tak, & Kin 883 [Herb. Can-

ton Chr. Coll. 12882] (Ca--274712). Szechuan: T. C. Lee 3321 (W--1990034); W. Wang 8114 (W--1990704). HAINAN ISLAND: How 70722 (B). INDOCHINA: Annam: Poilane 102 (Ca--38883), 6275 (Ca--53984). Cambodia: Bejaud 522 (B); Thorel s.n. [Me-Kong] (B). Cochinchina: Harmand 1889 [Pierre 648] (B, B, Ca--53979); Thorel 1591 (B). THAILAND: Bunpheng 1167 [Herb. Roy. Forest Dept. 22862] (Gg); Khantchai 341 [Herb. Roy. Forest Dept. 15970] (Sm); Winnit 34 (Ca--348889).

VITEX CAPITATA Vahl

Additional literature: Moldenke, Phytologia 5: 261--264 (1955), 5: 356 (1956), and 5: 466. 1957; Moldenke in Steyermark, Fieldiana 28: 1082. 1957; Moldenke, Résumé 62, 63, 69, 74, 111, 225, 309, 330, 381, 382, 391, & 475. 1959.

Additional citations: VENEZUELA: Bolívar: Ll. Williams 11642 (Ew), 12046 (Ew), 12696 (Ew). Guárico: Aristeguieta 4183 (Bm), 4187 (Bm). SURINAM: Rombouts 151 (Ut--144172b). BRAZIL: Rio Branco: J. G. Kuhlmann 2915 (S, S--photo).

VITEX CHRYSOMALLUM Steud.

Additional literature: Moldenke, Phytologia 5: 269--271. 1955.

Additional citations: MADAGASCAR: Decary s.n. [1 Mai 1928] (S).

VITEX CILIATA Pierre

Additional literature: Moldenke, Phytologia 5: 356. 1956; Moldenke, Résumé 140, 382, & 475. 1959.

Additional citations: FRENCH EQUATORIAL AFRICA: Gabun: Heintz 10 (B); Klaine 2809 (B), 3227 (Ca--54410); Le Testu 1701 (N).

VITEX CLEMENTIS Britton & P. Wils.

Additional literature: Moldenke, Phytologia 5: 273--274. 1955; Alain in León & Alain, Fl. Cuba 4: 317 & 318. 1957; Moldenke, Résumé 53 & 475. 1959.

VITEX COFASSUS Reinw.

Additional literature: Moldenke, Phytologia 5: 356 (1956) and 6: 13--14. 1957; Moldenke, Résumé 186, 191, 195, 198, 199, 202--205, 225, 274, 382, 386, 388, 423, & 475. 1959.

Additional synonymy: Vitex confusus Reinw. ex Moldenke, Résumé 382, in syn. 1959.

New Guinea foresters give the following additional descriptive details about the species: Small or medium-sized to large forest tree, 8--40 m. tall, branching from the base or the first branch 3--26 m. above the ground, of poor form or moderately straight; crown light-green, large and compact or spreading, to 20 m. in diameter, often sparse, the canopy irregular; bole 3--26 m. tall, usually crooked and twisted, fluted or

deeply fluted and channeled, 30—85 cm. in diameter at breast height, to 225 cm. in circumference at 2 m. height, with high fluted buttresses 2—6 m. tall, the buttresses very much grooved and flanged, fluted to the first branch, to 1.2 m. wide; trunk freely branched, 30—50 cm. in diameter; bark close, varying from light gray-brown, pale brownish-gray, or brown to pale-gray or white, 5—13 mm. thick, scaly or papery but of very fibrous texture, the outer bark varying from yellow-brown or very pale-brown to gray-brown, papery and peeling off in large thin fibery flakes or papery strips, somewhat mealy, the inner bark varying from dark straw or straw-colored to white with conspicuous rings of fibers or else green on the back with alternate yellow and white layers within; blaze light gray-brown; wood yellow to black in the center, with a definite smell, the sapwood often not clearly defined; sapwood varying from straw-colored or yellowish-brown to yellow, pale-yellow, or yellowish, about 5 cm. thick; heartwood varying from dark- or chocolate-brown to light-brown, often sharply defined, separated tangentially with some yellow; branches twisted, heavy; leaves rather thin, dull, the blades varying from dark- or dull-green to medium- or light-green or even light yellowish-green above, medium-green to pale or glaucous beneath; venation depressed above, yellowish and prominently raised beneath; inflorescence sometimes described as "dense compound spikes" or "axillary and terminal racemes", actually paniculate and cymose; corolla varying from dark-purple, blue-purple, or purplish-blue to violet, pale-violet, or mauve, sometimes described as "lavender and white"; fruit fleshy, green or light-green to gray-green when immature, dark-blue or black when ripe, black-purple inside, ovoid, surrounded on the lower half by the persistent fruiting-calyx.

The species has been found by collectors in clay or clayey soil, alluvial river flats, dry gravelly flatland in rainforests, flatland planting areas, swamp forests, primary forests, secondary forests, especially low secondary growth, and near riverbanks. It is said to be frequent in the canopy layer of rainforests and to be very common in flat country on Morotai. Some collectors note that there is a low percentage of fruit formation compared to the number of flowers produced. In addition to the months mentioned in Phytologia 5: 276 (1955), the species has been found in anthesis in June and October, and in fruit in January, March to May, September, and October. The very durable timber is used to make house posts, drums, plates, ax handles, and planks.

Additional vernacular names are "bitim", "garamut", "gowaha", "gopassa", "gowaka", "jangor", "la vase", "mokuli", "nar-a-vain", "pairi", "sarikon", and "sidoi".

The Kanehira 5 distributed as this species is var. puberula H. J. Lam.

Additional citations: CELEBES: Bünnemeijer 10773 (Ca--235266); Politan 6 [Boschbouwproefst. BB.31891] (Vi). MOLUCCA ISLANDS: Ceram: Kornassi 451 (Ca--234911), 1039 (Ca--265952). Morotai:

Main & Aden 926 (Ng--16903); Tangkilisan 19 [Boschbouwproefst. BB. 33731] (Ng--16870), 239 [Boschbouwproefst. BB.33909] (Ng--16959). NEW GUINEA: Batanta Island: Van Royen 3247 (N). Dutch New Guinea: Brouwer B.W. 809 (Ng--20224), B.W.843 (Ng--20225); Pleyte 1033 (Ng--16846, Ng); Rappard B.W.690 (Ng--16944). Northeastern New Guinea: Barrett 18 (Ng--16977); Cavanaugh 2022 (Ng--6567, Ng), 4052 (Ng--6573); Clemens 119 (B); Floyd 5388 (Ng--16914); Fryar 3347 (Ng--6570), 4000 (Ng--6572); E. Gray 3313 (Ng--6569); Hoogland 4869 (Ng--8326); McAdam 250 (Ng--6562, Ng); McViegh & Ridgwell 7366 (Ng--16900); "N. G. F." 866 (Ng--6564); A. C. Richardson 4088 (Ng--16869); J. C. Saunders 527 (Ng--16822); F. T. Vickery 1421 (Ng--6565, Ng); White, Dadswell, & Smith 1616 (Ng--6566); Womersley 2913 (Ng--6563), 2989 (Ng--6553), 3897 (Ng--6571). Papua: Brass 21909 (Ng--17165), 21950 (Ng--17163). BISMARK ARCHIPELAGO: New Britain: Floyd 6474 (Ng--16888), 6633 (Ng--16916); Womersley & Kazakof 7082 (Ng--16899). AROE ISLANDS: Kobroor: Buwalda 5006 (Ng--16956). SOLOMON ISLANDS: Bougainville: "N. G. F." 577 (Ng--6563). CULTIVATED: Java: Herb. Hort. Bot. Bogor. s.n. (B).

VITEX COFASSUS var. PUBERULA H. J. Lam

Additional literature: Moldenke, Phytologia 5: 280. 1955; Moldenke, Résumé 186, 202, 204, & 475. 1959.

Herbarium material of this variety is often misidentified as typical V. cofassus Reinw.

Additional citations: CAROLINE ISLANDS: Pelew Islands: Kanehira 5 (Ca).

VITEX COLUMBIENSIS Pittier

Additional literature: Moldenke, Phytologia 5: 280 & 293--295. 1955; Moldenke, Biol. Abstr. 30: 1704 & 3551. 1956; Biol. Abstr. 30: 4370. 1958; Moldenke, Résumé 69, 419, & 475. 1959.

VITEX COMPRESSA Turcz.

Additional literature: Moldenke, Phytologia 5: 295--300. 1955; Moldenke, Résumé 62--64, 69, 74, 76--78, 85, 111, 225, 276, 381, 389, 390, & 475. 1959.

Additional citations: BRITISH GUIANA: Jenman 7637 (S); Little 16877 (Z).

VITEX CONGOLENSIS DeWild. & Th. Dur.

Additional literature: Moldenke, Phytologia 5: 301--303 (1955) and 5: 357. 1956; Moldenke, Résumé 137, 139, 142, 379, 383, 419, & 475. 1959.

Additional citations: BELGIAN CONGO: Callens 4947 (Z).

VITEX COOPERI Standl.

Additional literature: Moldenke, Phytologia 5: 303--305. 1955; Moldenke, Résumé 43, 44, 47, 49, & 475. 1959.

The species is said by Allen to have pale-blue flowers and to grow in pastures.

Additional citations: NICARAGUA: Zelaya: Shank 14172 (Ca—29618). COSTA RICA: Puntarenas: P. H. Allen 6250 (Ca—10782). PANAMA: Canal Zone: Stern & Chambers 159 (N).

VITEX CYMOSA Bert.

Additional literature: Moldenke, Phytologia 5: 357. 1956; Moldenke, Résumé 69, 74, 111, 115, 118, 128, 225, 301, 382, 383, 387, & 475. 1959; Angely, Fl. Paran. 16: 80 (1960) and 17: 47. 1961.

Additional synonymy: Vitex cimosa Bert. ex Angely, Fl. Paran. 16: 80, sphalm. 1960.

Additional citations: BRAZIL: Pará: Krukoff 5903 (Mi). PARAGUAY: Hassler 12307 (Go). CULTIVATED: Brazil: Bot. Gard. Goeldi tree 863 (Bm).

VITEX DIVARICATA Sw.

Additional literature: Moldenke, Phytologia 5: 357. 1956; Moldenke, Résumé 56, 57, 59—63, 74, 225, 234, 353, 383, 391, & 476. 1959.

The Williams specimen cited below bears striking resemblance to V. orinocensis var. multiflora (Miq.) Huber.

Additional citations: PUERTO RICO: Otero M.47 (Mi. VENEZUELA: Aragua: Ll. Williams 11119 (Mi).

VITEX DIVARICATA var. CUBENSIS Urb.

Additional literature: Moldenke, Phytologia 5: 319—321. 1955; Moldenke, Résumé 53, 57, 225, 383, & 476. 1959.

Howard describes this as a shrub 7 feet tall, growing on limestone outcrops.

Additional citations: CUBA: Havana: P. Wilson 1066 (Ca—683274—cotype). Las Villas: C. F. Baker 3409 (Ca—683293); Howard, Briggs, Kamb, Lane, & Ritland 59 (Ca—998435).

VITEX DONIANA Sweet

Additional literature: Moloney, Sketch Forest. W. Afr. 523. 1887; Moldenke, Phytologia 5: 357—358. 1956; Alain in León & Alain, Fl. Cuba 4: 317 & 318. 1957; Moldenke, Résumé 53, 133—140, 142, 143, 145—147, 150, 151, 155, 157, 225, 227, 382, 384, 387, 390, 426, & 476. 1959; Moldenke, Résumé Suppl. 1: 9 & 10. 1959.

Alain records the vernacular name "ofón" from Cuba, Peter lists "mfudu" from Tanganyika, and Brass gives "npindimbi" from British Nyasaland. Dr. Buchheim reports that there is a specimen of this species collected by Engler on October 7, 1905 [A. Peter 51820] preserved in the Berlin herbarium.

Recent collectors describe this species as a medium-sized much-branched tree, completely deciduous, the trunk 30—80 cm. in diameter, the bole thick, giving thick cover, bark gray-lined, with brown slip; wood white, soft to cut; sap colorless; leaves

glossy, bright-green or very dark-green above and grayish beneath; flowers mauve, blue, purple, or white to pale-pink, small, aromatic; fruit edible, blackish-purple when ripe. Peter 8279 and 51821 exhibit leaves that are abundantly galled, the galls prominent and rounded on the upper leaf-surface. In addition to the months listed in my monograph, it has been found in anthesis in January, April, June, and November, and in fruit in June and July. It has been collected at altitudes of 300 to 2165 meters, on hard stony soil in open parkland and in gullies in Brachystegia woodland. It has been misidentified in herbaria as V. madiensis Oliv.

Additional citations: LIBERIA: Dinklage 1905 (B). IVORY COAST: Aubréville 806 (B); Serv. Forest. 428bis (B). CAMEROONS: Zenker 742b (B); Zenker & Staudt 302 (Ca—617110). TANGANYIKA: Engler s. n. [A. Peter 51818] (B), s.n. [A. Peter 51819] (B); Faulkner 1163 (S), 1202 (S); Goetze 1397 (B); Grote s.n. [A. Peter 51809] (B); A. Peter 4491b [O.I.137] (B), 7250 [O.II.115] (B), 7299 [O.II. 117] (B), 8279 [O. III.30] (B), 8334 [O.III.33] (B), 12817 [O. III.162] (B), 14950 [O.III.234] (B), 16207 [O.IV.35] (B), 16351 [O. IV.43] (B), 17281 [O.IV.78] (B), 31639 [V.55] (B), 32109 [V. 66] (B), 51821 [O.III.30] (B); Schlieben 1282 (B); Stuhlmann s.n. [A. Peter 51817] (B); Tanner 1758 (Ca—183319). ZANZIBAR: E. H. L. Krause 16804 (B). ANGOLA: Lunda: Gossweiler 14109 (B). BRITISH NYASALAND: Brass 17074 (Ca—17074); Stolz 402 (B).

VITEX DONIANA var. PARVIFOLIA (Engl.) Moldenke

Additional literature: Moldenke, Phytologia 5: 326—327. 1955; Moldenke, Résumé 139, 142, 148, 382, & 476. 1959.

Additional citations: BELGIAN CONGO: Callens 4778 (Z).

VITEX DUCKEI Huber

Additional literature: Moldenke, Phytologia 5: 328—330 (1955) and 5: 358—359. 1956; Moldenke, Résumé 111 & 476. 1959.

Additional citations: BRAZIL: Pará: Murça Pires, Black, Wurdack, & Silva 6523 (Bm, N).

VITEX EPIDICTYOIDES Mildbr.

Additional literature: Moldenke, Phytologia 5: 332. 1955; Moldenke, Résumé 142, 145, 150, & 476. 1959.

Peter describes this plant as a tree, 2 m. tall, fruiting in February, growing at an altitude of 840 meters.

Additional citations: TANGANYIKA: A. Peter 37004 [V.158] (B), BRITISH NYASALAND: Stolz 556 (B—isotype).

VITEX ERIOCLONA H. J. Lam

Additional literature: Moldenke, Phytologia 5: 332—333. 1955; Moldenke, Résumé 195 & 476. 1959.

Tree; branches subtetragonal, the younger parts striate, fulvous- or cinereous-farinose; leaves 1-foliolate, petiolate; petioles very slender, 1.5—3.5 cm. long, with an indistinct articu-

lation at the apex, sulcate above, fulvous- or cinereous-farinose; leaflet-blade sessile, ovate-elliptic, 9.5—15 cm. long, 4.5—5.7 cm. wide, acute at the apex, entire, acute or broadly cuneate to rounded or truncate at the base, glabrous (except for the puberulous midrib) and brunnescent above in drying, very densely yellow tomentose beneath; secondaries 7—12 per side, prominulent; inflorescence terminal, paniculate, foliose at the base, rather conspicuously bracteolate, fulvous- or cinereous-farinose throughout; cymes opposite, many-flowered, the lower ones 10—14 cm. long and 4—6 cm. wide, borne on a peduncle 3—4 cm. long; bractlets foliaceous, ovate-lanceolate, 3—4.5 mm. long, 1.5—2 mm. wide; flowers known only in the bud stage; pedicels 1—5 mm. long; calyx cupuliform, about 2 mm. long, tomentose on the outer surface, the rim with 5 minute acute teeth; corolla in bud 5 mm. long, puberulent on the outside except for the lower portion, minutely and sparsely villous within except for the lower part, glabrous from the stamen insertion to the base; stamens 4, inserted in the lower part of the corolla-tube; filaments with a few glanduliferous hairs at the base; style slender; stigma very shortly bifid; ovary striate at the base, smooth at the apex, with a few hairs.

VITEX EXCELSA Moldenke

Additional literature: Moldenke, Phytologia 5: 333—334. 1955; Moldenke, Résumé 111 & 476. 1959.

The flowers are described as violet, the tree blossoming in February, growing at an altitude of 300 meters, and called "malocopeici" in the Paramaka dialect. It has been misidentified in herbaria as V. polygama Cham.

Additional citations: FRENCH GUIANA: Herb. Bot. Mus. Utrecht 59365b (Ut). BRAZIL: Amazonas: Krukoff 6873 (Mi—isotype).

VITEX FISCHERI Gürke

Additional literature: Moldenke, Phytologia 5: 335—336. 1955; Moldenke, Résumé 145, 146, & 476. 1959.

Recent collectors describe this as a tree, 20 feet tall, with green fruit in January, growing on sandy soils.

Additional citations: TANGANYIKA: Shantz & Turner 4235 (Au).

VITEX FLAVA Ridl.

Additional literature: Moldenke, Phytologia 5: 336. 1955; Moldenke, Biol. Abstr. 30: 3551. 1956; Moldenke, Résumé 193 & 476. 1959.

VITEX FLORIDULA Duchass. & Walp.

Additional literature: Moldenke, Phytologia 5: 361—362. 1956; Moldenke, Résumé 49 & 476. 1959.

Additional citations: PANAMA: Panamá: P. H. Allen 959 (Ca—790750, Mi).

VITEX GAMOSEPALA Griff.

Additional literature: Moldenke, Phytologia 5: 364—365. 1956; Moldenke, Résumé 178, 181, 383, & 476. 1959.

Additional citations: MALAYA: Selangor: Kloss s.n. [Menuang Gasing, 1912] (Ca—266873).

VITEX GAMOSEPALA var. KUNSTLERI King & Gamble

Additional literature: Moldenke, Phytologia 5: 365—366. 1956; Moldenke, Résumé 181, 188, 194, 379, 386, 390, 391, & 476. 1959.

Additional synonymy: Vitex vestita var. glabrior H. J. Lam ex Moldenke, Phytologia 6: 213. 1958. Vitis gamosepala Henderson, in herb.

Recent collectors describe this plant as a shrub 12 feet tall or a tree 25 feet tall and with a trunk 8 inches in diameter, with lemon-yellow flowers in April, growing in forests or a the edge of forests at an altitude of 3000 meters. The Yates 2036 specimen in the University of California herbarium is accompanied by a photograph.

Additional citations: MALAYA: Pahang: M. R. Henderson 11420 (Ca—360539). SUMATRA: Boeea 7155 (Ca—14675), 7971 (Ca—14665); Forbes 2771 (N—photo); Posthumus 702 (B); Yates 1183 (Ca—251192), 2036 (B, Ca—291986).

VITEX GARDNERIANA Schau.

Additional literature: Moldenke, Phytologia 5: 366—368 (1956) and 6: 14. 1957; Moldenke, Résumé 111, 383, & 476. 1959.

Cutler reports the flowers as blue, in October, and found the plant growing alongside a dry wash. It has been misidentified in herbaria as Citharexylum sp.

Additional citations: BRAZIL: Ceará: Cutler 8263 (N); Drouet 2389 (Mi).

VITEX GAUMERI Greenm.

Additional literature: Moldenke, Phytologia 5: 368—373 & 404 (1956) and 5: 466. 1957; Moldenke, Résumé 40, 43, 44, 329, 383, 388, & 476. 1959.

Williams & Molina R. found this species in a pine forest area in Honduras.

Additional citations: MEXICO: Campeche: Matuda 3905 (Mi). Tabasco: Matuda 3115 (Mi), 3231 (Mi). Yucatán: Gaumer & sons 23567 (B). HONDURAS: Morazán: Williams & Molina R. 10271 (Ca—10786).

VITEX GIGANTEA H.B.K.

Additional literature: Holdridge & al., Forests West. & Cent. Ecuador 23, 25, 46, & 67. 1947; Moldenke, Phytologia 5: 373—375. 1956; Moldenke, Résumé 81, 85, 225, & 476. 1959.

Asplund reports the flowers as light bluish-violet, blooming in October. Miss Mexia calls it an almost leafless tree, with "good hard wood."

Additional citations: ECUADOR: Guayas: Böcher, Hjerting, & Rahn 201 (S). PERU: Loreto: Mexia 6177 (Go, Go, Mi). CULTIVATED:

Ecuador: Asplund 18198 (S).

VITEX GLABRATA R. Br.

Additional literature: Moldenke, Phytologia 5: 376—381 (1955) and 6: 14. 1957; Moldenke, Résumé 159, 164, 166, 177, 178, 181, 185, 191, 194—196, 198, 199, 202, 211, 225, 382—387, & 476. 1959.

Collectors describe this as a "good-sized tree" or a tree to 20 feet tall, in primary forests, along riversides, and at stream margins, with violet flowers and very dark-colored fruit. It is said to be rather common in Dutch New Guinea. It has been found in anthesis in June and in fruit in August. The common name "amuraon" is recorded from the Philippines. Rodin 794 was misidentified as Allophyllus sp.

Additional citations: INDOCHINA: Annam: Clemens & Clemens 4179 (Ca--339854). Cambodia: Harmand s.n. [6 juni 1875] (B); Thorel s.n. [Me-Kong] (B). Cochinchina: Harmand s.n. [Hué] (B). THAILAND: Boonkird 7 [Herb. Roy. Forest Dept. 2477] (Vi); Kerr s.n. [June 1st, 1924] (Ca--248912); Pierre 110 (B). PHILIPPINE ISLANDS: Negros: Masias, Sareno, & Torribile s.n. [Herb. Philip. Forest. Bur. 30116] (Ca--291854). Palawan: Cenabre s.n. [Herb. Philip. Forest. Bur. 29988] (Ca—291787). MARIANNA ISLANDS: Guam: Rodin 794 (Ca—756878). JAVA: Koorders 9748b (Ca--265953). CELEBES: Boschproefst. BB.3027 (Ca--234910). NEW GUINEA: Dutch New Guinea: H. J. Lam 1144 (Ca--234912, Ca—3748628, Ca); Schram B.W.2748 (Ng—20215).

VITEX GLABRATA var. POILANEI Moldenke

Additional literature: Moldenke, Phytologia 4: 61 (1952) and 5: 383. 1956; Moldenke, Résumé 177 & 476. 1959.

The variety has been collected in anthesis in May.

Additional citations: INDOCHINA: Cochinchina: Pierre 1838 (Ca--38164); Poilane 40849 (B—isotype, Ca—53765—isotype); Thorel 1084 (B), s.n. [Ihany] (Ca--53756).

VITEX GRANDIFOLIA Gürke

Additional synonymy: Vitex grandiflora Gürke, in herb. [not V. grandiflora Turcz., 1863].

Additional literature: Moldenke, Phytologia 5: 385--387 & 404. 1956; Moldenke, Résumé 136--140, 225, 381—383, 386, & 476. 1959.

Blickenstaff describes the flowers of this species as "yellow with brown centers" and found the plant blooming in March in secondary growth. Daniel found it in sandy soil along a stream, flowering in April.

Additional citations: LIBERIA: Blickenstaff 18 (N); P. M. Daniel 331 (N); E. H. L. Krause 16837 (B). CAMEROONS: Büsgen 72a (B); Zenker s.n. [Bipindi, May 1897] (Ca--620194). FRENCH EQUATORIAL AFRICA: Gabun: Klaine 3235 (Ca—54409), 3268 (B), s.n. [Libreville] (N).

VITEX HARVEYANA H. H. W. Pearson

Additional literature: Moldenke, Phytologia 5: 390—391. 1956; Moldenke, Résumé 151, 154, 389, & 476. 1959.

The Rodin 4232, cited below, is cited by Miss Bruce in her original description of V. patula E. A. Bruce. This taxon obviously needs further study.

Additional citations: SOUTHERN RHODESIA: E. H. Wilson s.n. [Victoria Falls, January 13, 1922] (Ca—381198). UNION OF SOUTH AFRICA: Transvaal: Rodin 4232 (Ca—803667).

VITEX HAUSKNECHTII Borrm.

Additional literature: Moldenke, Phytologia 5: 391—392. 1956; Moldenke, Résumé 158, 380, 384, & 476. 1959.

The Gabriels on their collection no. 3 of V. agnus-castus var. pseudo-negundo Hausskn. affirm that in their opinion V. hausknechtii is merely another name for the same taxon.

Citations: SYRIA: Haussknecht s.n. [Marasch] (B—isotype).

VITEX HEMSLEYI Briq.

Additional literature: Moldenke, Phytologia 5: 393 & 404—405. 1956; Moldenke, Résumé 40, 276, 382, 385, 387, 415, 416, & 476. 1959.

McVaugh describes the flowers as blue, tinged violet, the lower lip darker, the orifice of the lower lip yellow-margined, purple and white lined, fruit green, hard. He reports the tree as occasional on bluffs of wooded barrancas, and on rocky hills in deciduous forest dominated by various legumes, Bursera, and Ficus, at altitudes of 135 to 300 meters.

Additional citations: MEXICO: Colima: McVaugh 15490 (Mi), 15770 (Mi). Guerrero: Hinton 10189 (Ca—98243, Mi, N). Michoacán: Hinton 13789 (Ur).

VITEX HEPTAPHYLLA A. L. Juss.

Additional synonymy: Vitex umbrosa Auct. ex Alain in León & Alain, Fl. Cuba 4: 318, in syn. 1957 [not V. umbrosa Sw., 1800, nor G. Don, 1824, nor Schau., 1940].

Additional literature: Griseb., Abhand. König. Gesell. Wissen. Götting. 7: 257. 1857; Moldenke, Phytologia 5: 406—409. 1956; Alain in León & Alain, Fl. Cuba 4: 317 & 318, fig. 137. 1957; Moldenke, Résumé 53, 57, 381, 384, 386, 390, & 476. 1959.

Illustrations: Alain in León & Alain, Fl. Cuba 4: fig. 137. 1957.

Grisebach, in the reference cited above, implies that this species is found on Guadeloupe and Dominica, but it is V. divaricata Sw. which occurs on those islands. Holdridge reports that the tree has a trunk 3 dm. in diameter at breast-height when 8 m. tall, the flowers deep-purple, and the fruit orange, flowering and fruiting in December, growing at 1000 m. altitude.

Additional citations: CUBA: Oriente: C. Wright 1355 [1860] (Ca-936795). HISPANIOLA: Dominican Republic: Ekman H.11292 (W—

1710990). Haiti: Holdridge 1839 (Mi, N).

VITEX HOCKII DeWild.

Synonymy: Vitex cussoniifolia Peter ex Moldenke, Résumé 382, in syn. 1959. Vitex rudis Peter ex Moldenke, Résumé 388, in syn. 1959.

Additional literature: Moldenke, Phytologia 5: 410. 1956; Moldenke, Résume 142, 147, 382, 388, 426, & 476. 1959; Moldenke, Résumé Suppl. 1: 9. 1959.

Peter describes this plant as a shrub, 2 meters tall, with blue flowers, blossoming in February, growing at altitudes of 800 to 1350 meters.

Additional citations: TANGANYIKA: A. Peter 36847 [V.154] (B), 37495 [V.164] (B), 46368 [V.178] (B).

VITEX HOLOADENON Dop

Synonymy: Vitex holoadendron Dop ex Moldenke, Résumé 384, in syn. 1959.

Additional literature: Moldenke, Phytologia 5: 410—411. 1956; Moldenke, Résumé 177, 384, & 476. 1959.

Citations: INDOCHINA: Cambodia: Thorel 2028 (B—cotype).

VITEX INTEGRIFOLIA Urb.

Additional literature: Moldenke, Phytologia 5: 416—417. 1956; Moldenke, Résumé 57 & 476. 1959.

Additional citations: HISPANIOLA: Dominican Republic: Ekman H.14882a (Ca—608086).

VITEX KENIENSIS Turrill

Additional literature: Moldenke, Phytologia 5: 420—422. 1956; Moldenke, Résumé 146 & 476. 1959.

Recent collectors describe this plant as a tree or small tree, 5—10 meters tall; crown low, wide-spreading, bushy; trunk about 15 cm. in diameter; bark gray-brown, corrugated; sap colorless; petioles pubescent; calyx yellow-brown-pilose; corolla white, or whitish with a purplish lower lip, the petals yellowish on the outside, white inside, the lower lip purplish-violet; anthers yellow-brown; stigma light-green; fruit green when unripe, partly flushed with brown, white-dotted, edible, used to add flavor to tobacco snuff; flowers aromatic.

It is said to inhabit wooded grasslands, in thick forests on red fossil sandy laterized soil, and in grass-covered glades with scattered trees or tree-clumps, among others Erythrina sp., at an altitude of 1600 meters, flowering in July, September, and November. A native name is "mpuru". Herbarium material has been misidentified as V. fischeri Gürke. Drummond & Hemsley found it in secondary regeneration on old cultivated land, flowering in October.

Citations: TANGANYIKA: Tanner 1119 (Ca—168647). KENYA: Bogdan 439 (Ca—984078); Drummond & Hemsley 4752 (S, Z); Maas Geesteranus 6282 (Ca—92359).

VITEX KLUGII Moldenke

Additional literature: Moldenke, Phytologia 5: 422--424. 1956; Moldenke, Am. Midl. Nat. 59: 365. 1958; Moldenke, Résumé 69, 74, 85, 111, 380, 390, & 476. 1959.

Recent collectors describe the flowers of this plant as having the 2 upper corolla-lobes white and the 3 lower ones purple. They found it in a slope forest from 650 to 700 meters in altitude.

Additional citations: VENEZUELA: Amazonas: Maguire, Wurdack, & Maguire 42575 (N). BRAZIL: Amazonas: Krukoff 7149 (Mi).

VITEX KRUKOVII Moldenke

Additional literature: Moldenke, Phytologia 5: 424--425. 1956; Moldenke, Résumé 111 & 476. 1959.

Additional citations: BRAZIL: Amazonas: Krukoff 6279 (Mi--isotype).

VITEX KUYLENII Standl.

Additional literature: Moldenke, Phytologia 5: 425--427 (1956) and 5: 466. 1957; Moldenke, Résumé 40, 43, 44, 384, 385, 389, & 476. 1959.

The C. L. Lundell 6421, distributed as this species, is not verbenaceous; it is probably a species of Tabebuia in the Bignoniaceae.

VITEX KWANGSIENSIS P'ei

Additional literature: Moldenke, Phytologia 5: 427--428. 1956; Moldenke, Résumé 171 & 476. 1959.

Citations: CHINA: Kwangsi: H. B. Morse 617 (N--type).

VITEX LANCEOLATA Turcz.

Additional literature: Moldenke, Phytologia 5: 430--431. 1956; Moldenke, Résumé 191 & 476. 1959.

Examination of a photograph of the type of this species, recently received from Russia, reveals that the species is conspecific with Psychotria sarmentosa Blume and is to be reduced to the synonymy of that rubiaceous plant.

VITEX LANIGERA Schau.

Additional literature: Moldenke, Phytologia 5: 431--432. 1956; Moldenke, Résumé 157, 251, & 476. 1959.

Humbert states that the flowers of this plant are dark-purple, with the filaments and anthers dark-violet.

Additional citations: MADAGASCAR: Humbert 2964 (B), 3627 (B).

VITEX LEUCOXYLON L. f.

Additional literature: Moldenke, Phytologia 5: 436--439. 1956; Moldenke, Résumé 164, 166, 167, 181, 191, 225, 385, 388, 389, 393, & 476. 1959.

Additional citations: INDIA: Bombay: Hohenacker 451 (Ut--115370b).

VITEX LIMONIFOLIA Wall.

Additional literature: Moldenke, Phytologia 5: 439—440. 1956; Moldenke, Résumé 166, 177, 178, 225, 380, 385, & 476. 1959.

Additional citations: BURMA: Upper Burma: Wallich 1754 "1 et 2" (B—isotype). INDOCHINA: Cambodia: Pierre 5216 (Ca—54809). THAILAND: Charoenmayu 495 [Herb. Roy. Forest Dept. 4386] (Vi); Pierre 5216, in part (B).

VITEX LOKUNDJENSIS Pieper

Additional literature: Moldenke, Phytologia 5: 443—444. 1956; Moldenke, Résumé 139, 142, 145, 149, & 476. 1959.

Peter collected this species at 1400 meters altitude in Tanganyika, but misidentified it as V. quadrangula Gürke. The Zenker collection cited below was misidentified as V. bipindensis Gürke, while Schlieben 1681 was annotated by someone as "Vitex prob. nov. aff. Lehmbachii Gürke".

Additional citations: CAMEROONS: Zenker s.n. [Bipinde, July 1918] (Ca—483845). TANGANYIKA: A. Peter 6997 [O.II.105] (B); Schlieben 1681 (B, B), 3148 (B), 3255 (B).

VITEX LONGIPETIOLATA Gürke

Additional literature: Moldenke, Phytologia 5: 444—445. 1956; Moldenke, Résumé 139 & 476. 1959.

Herbarium material of this plant has been misidentified as V. bipindensis Gürke.

Additional citations: CAMEROONS: Zenker 1888 (B—isotype), 3185 (B), 4795 (B), s.n. [Bipindi, Sept. 1904] (N), s.n. [Bipindi] (Ca—620104).

VITEX LONGISEPALA King & Gamble

Additional synonymy: Vitex longisepala King ex Ridl., Kew Bull. 1929: 261 & 262. 1929.

Additional literature: Ridl., Kew Bull. 1929: 261—262. 1929; Moldenke, Phytologia 5: 445—446. 1956; Moldenke, Résumé 178, 181, & 476. 1959.

The species has been collected in anthesis in November.

Additional citations: MALAYA: Negri Sembilan: Holttum 9807 (Ca—346226).

VITEX LUCENS T. Kirk

Additional and emended literature: Raoul Choix 44. 1846; Hook. f., Fl. Nov. Zel. 1: 203. 1853; Hook. f., Handb. New Zeal. Fl. 223. 1864; Laing & Blackwell, Pl. New Zeal., ed. 1, 350 & 351, fig. 114. 1906; Cheeseman, Man. New Zeal. Fl., ed. 1, 565. 1906; Cockayne, Distrib. Veg. Fl. N. Zeal. 14. 1919; Cheeseman, Man. New Zeal. Fl., ed. 2, 763—764. 1925; Laing & Blackwell, Pl. New Zeal., ed. 3, 354—356, fig. 127 (1927) and ed. 4, 372—373, fig. 139. 1940; Moldenke, Phytologia 5: 446—448. 1956; Moldenke, Résumé 211, 225, 285, 383, 385, 387, & 476. 1959.

Additional illustrations: Laing & Blackwell, Pl. New Zeal., ed. 1, fig. 114 (1906), ed. 3, fig. 127 (1927), and ed. 4, fig. 139. 1940.

Cheeseman states that this species is abundant on North Island from the North Cape to the Waikato and Upper Thames, then sparingly southward to Mahia Peninsula and Cape Egmont, growing from sea-level to 2500 feet altitude, and blooming from June to October. He says that it is "A well-known tree, producing the most valuable hardwood in the Dominion, extensively used for all purposes requiring great strength and durability, as railway-sleepers, the framework of bridges, piles, house-blocks, &c. Also greatly employed for furniture and cabinetwork, and quite equal in figure and general appearance to the best Italian or American walnut."

Cockayne, in the reference cited above, states that this is one of the some 56 species, of which 45 are common or fairly common, which appear to be stopped in New Zealand by the so-called 38° S. phytogeographic barrier. Miss L. B. Moore, in a letter to me dated August 6, 1959, says that the southern limit for this species is nearer 39° S. lat.

Walker describes it as a large tree, a new trunk forming from the branches if the tree blows over, with green fruit in April which become red when riper and finally turn purple. He found it in an open pasture. The Setchell collection cited below represents a seedling and shows very coarsely serrate leaves.

Additional citations: NEW ZEALAND: North Island: Inackie s.n. [Waikowhai, 8/10/32] (Ca—583292); W. A. Setchell s.n. [Ruatangata, July 11, 1904] (Ca—61420), s.n. [Ruatangata, July 12] (Ca-61406); E. H. Walker 5312 (Ca—923255).

VITEX LUTEOGLANDULOSA H. J. Lam

Additional literature: Moldenke, Phytologia 5: 448—449. 1956; Moldenke, Résumé 202 & 477. 1959.

The labels on the type collection are inscribed "Plantae Papuanae", but the material actually came from what was then called Kaiser-Wilhelmsland, now Northeastern New Guinea, not Papua. It has been collected in anthesis in September.

Additional citations: NEW GUINEA: Northeastern New Guinea: F. R. R. Schlechter 16593 (Ca—226889—isotype).

VITEX MADIENSIS Oliv.

Additional literature: Moldenke, Phytologia 5: 451—455. 1956; Moldenke, Résumé 133, 134, 136, 139, 140, 142, 143, 147, 381, 386, & 477. 1959.

Additional citations: ANGOLA: Lunda: Buchner 575 (B); Gossweiler 13624 (B), 13692 (B).

VITEX MADIENSIS var. MILANJIENSIS (Britten) Pieper

Additional literature: Moldenke, Phytologia 5: 453 & 457—458. 1956; Moldenke, Résumé 142, 148, 150, 151, 386, 388, & 477. 1959; Moldenke, Résumé Suppl. 1: 10. 1959.

Additional citations: PORTUGUESE EAST AFRICA: Mozambique: A. Peter 51198 [S.67] (B).

VITEX MASONIANA Pittier

Additional literature: Moldenke, Phytologia 5: 461—463. 1956; Moldenke, Résumé 49, 386, & 477. 1959.

Recent collectors describe this as a tree 50 to 150 feet tall, with a trunk diameter at breast height of 6 to 34 inches, a widely spreading crown, coarse leaves, pale-purple flowers, the central lobe of the lower lip purple, yellow in the throat, the outer lobes white to lavender, anthers black, filaments white, and the immature fruit green, later brown, fruity in odor, growing at the edges of roads, flowering in July, in fruit in June and July.

Additional citations: PANAMA: Darien: Stern, Chambers, Dwyer, & Ebinger 299 (Bm), 903 (Bm), 958 (Z).

VITEX MEGAPOTAMICA (Spreng.) Moldenke

Additional literature: A. Schultz, Introd. Estud. Bot. Sist., ed. 2, 484 & 562. 1943; Moldenke, Phytologia 5: 464 & 466—471 and 6: 14. 1957; Angely, Fl. Paran. 11: 22 & 31. 1957; Veloso & Klein, Sellowia 8: 182, 186, & 220. 1957; Moldenke, Résumé 111, 118, 120, 128, 225, 237, 341, 386, 389, 391, & 477. 1959; Reitz, Sellowia 11: 135. 1959; Veloso & Klein, Sellowia 11 (10): 99 & 105. 1959; A. R. Schultz, Inst. Tec. Rio Grande do Sul Pub. 30: 15. 1960; Rambo, Pesquisas 4: 18. 1960; Angely, Fl. Paran. 16: 80 (1960) and 17: 47. 1961.

Additional vernacular names recorded for this plant are "raeumã preto", "tapinhoã", "taruma duro", and "tarumã preta". It has been collected at sea-level, in pinewoods, residual forests, riverbank forests, and "in mato branco without Araucaria". The flowers are described by Brade as yellowish and blue, while Reitz & Klein describe them as white and red or white and light-violet, and the fruit as dark-red. They found the species on varzea land, fruiting in February.

Additional citations: BRAZIL: Paraná: H. M. Filho 74 [Herb. Mus. Paran. 5316; Herb. Curso Farmac. 719] (S). Rio de Janeiro: Brade 14126 [Herb. Rio de Jan. 29519] (B); Santos Lima & Brade 13295 [Herb. Rio de Jan. 29518] (B). Rio Grande do Sul: Rambo 27080 (Gg—354595); Sehnem 3516 (Gg—356389). Santa Catarina: Klein 232 [Herb. Barb. Rodr. 4610] (N), 303 [Herb. Barb. Rodr. 4653] (N), 1852 [Herb. Barb. Rodr. 10069] (N, W—2220607), 1858 (W—2220609); Rambo 31521 (Ur); Reitz & Klein 3009 [Herb. Barb. Rodr. 14212] (N, Sm), 5915 (Sm), 5968 [Herb. Barb. Rodr. 16273] (N, Sm), 6409 (Sm), 7581 (Mm), 7613 (Mm), 8506 (Mm), 9325 (Gg); Smith & Klein 8027 (N, Ok), 8284 (Ok), 10685 (Ok), 11928 (Ok). PARAGUAY: Hassler 11417 (Tl). URUGUAY: Herter 1392 [Herb. Herter 88856] (N), 1392b [Herb. Herter 94042] (N). CULTIVATED: Uruguay: Herter 1392d [Herb. Herter 98517] (N).

VITEX MEXIAE Moldenke

Additional literature: Moldenke, Phytologia 5: 471--473. 1957; Moldenke, Résumé 111, 225, 381, 389, & 477. 1959.

Irwin describes the corolla as pale-lavender, and notes that the plant is common in red clay soil of secondary forests.

Additional citations: BRAZIL: Minas Gerais: Irwin 2062 (N, W--2281262); Mexia 5251 (Go), 5474 (Go).

VITEX MICRANTHA Gürke

Additional literature: Moldenke, Phytologia 5: 473--474. 1957; Moldenke, Résumé 137, 139, 385, & 477. 1959.

An additional vernacular name recorded for this plant is "and-ofiti".

Additional citations: IVORY COAST: Aubréville 105 (N); Banco 386 (B, Ca--53500).

VITEX MOLLIS H.B.K.

Additional literature: Moldenke, Phytologia 5: 476--481. 1957; Moldenke, Résumé 40, 225, 276, 384--387, 389, 390, & 477. 1959.

Hinton found this species growing in a coconut orchard at only 20 meters altitude. Other recent collectors have found it scattered in small canyons, in rocky deciduous woodlands, abundant near the summits of ravines, in open brushy palm savannas, an uncommon tree in loam soil on old lava flows in open sun, in gravelly-granite soil on hillslopes, om arid slopes with low scattered trees, and in grazed areas with the vegetation mostly thorny leguminous trees and shrubs. King reports it as "a fairly common tree" in Oaxaca, while the Wilburs describe it as a "very common tree.. fruit sold in markets" in Jalisco. Turner reports that it is used by the natives in Michoacán in treatment of stomach ache. Pennington 106 is a mixture with something non-verbenaceous. He reports that the fruit is "very refreshing, eaten raw or added to goat milk; leaves are boiled and put on rheumatic patients".

Recent collectors describe the crown as 25 m. wide; corolla pale-lavender, the upper (smaller) lip nearly white, the lower lip darker, the tube purple-lined within; fruit globose, brown or black when ripe, reddish on the upper half, to 2.5 cm. wide, resembling a small apple (Malus pumila), juicy.

It has been found in anthesis also in July and November. Additional vernacular names are "atoyac", "higualmo", and "jarí". The M. E. Jones 23032 distributed as this species is actually Tabebuia chrysantha (Jacq.) Nichols. in the Bignoniaceae.

Additional citations: MEXICO: Chihuahua: Hartman 1034 (Ca--702713, Du--351432); Pennington 106 (Au--122928). Guerrero: Hinton 10989 (Ca--97688, Mi, N). Jalisco: McVaugh 11973 (Mi), 12158 (Mi); Wilbur & Wilbur 2018 (Mi). Michoacán: McVaugh 15051 (Mi), 15052 (Mi); B. L. Turner 2183 (Mi); Leavenworth & Hoogstraal 1726 (Mi). Morelos: Pringle 6993 (B). Nayarit: Feddema 446 (Mi); M. E. Jones 22898 (Gg--172864); McVaugh 12078 (Mi), 15222 (Mi). Oaxaca: R. M. King 1259 (W--2301502); Wiggins 13286 (Du--404053). Sonora: R. V.

Moran 4024 (Ca--1758, Du--353268); Wiggins & Rollins 452 (Ca--721797).

VITEX MOMBASSAE Vatke

Additional synonymy: Vitex mombassae Rich. ex Moldenke, Résumé 386, in syn. 1959. Vitex mombassae Vahl ex Moldenke, Résumé, 386, in syn. 1959.

Additional literature: Moldenke, Phytologia 5: 481--483. 1957; Moldenke, Résumé 143, 145, 146, 148--151, 383, 386, 389, & 477. 1959.

Recent collectors describe this species as a small spindly tree, to 5 m. tall, with gray smooth bark and pale-blue or white and blue flowers, blossoming in March and April. It has been collected in fruit in January and August at altitudes to 1640 m. Bullock reports it as common in the scrub on hillsides.

Additional citations: TANGANYIKA: A. A. Bullock 2372 (S); Busse 2784 [A. Peter 51808] (B); Holtz s.n. [A. Peter 51813] (B); A. Peter 22959 [O.IV.278] (B), 34223 [V.115] (B), 35007 [V.126] (B), 35332 [V.132] (B), 39641 [V.208] (B), 44138 [V.324] (B), 44231 [V.325] (B); Schlieben 1477 (B), 5353 (B). BRITISH NYASALAND: Stolz 1737 (B). SOUTHERN RHODESIA: Wormald 79/51 (Ca--10495).

VITEX MONROVIANA Pieper

Additional literature: Moldenke, Phytologia 5: 484--485. 1957; Moldenke, Résumé 137 & 477. 1959.

Dinklage describes this as a medium-sized tree, ferruginous tomentose-hirsute throughout, growing at an altitude of 20 m. It has been misidentified in herbaria as V. rufa A. Chev.

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A NEW COLOR FORM OF THE GROUNDNUT

Fred W. Oswald

APIOS AMERICANA f. KEIHNERI Oswald, f. nov.

Haec forma a forma typica speciei corollis nisi quod in gula macula parva alba ubique indico- usque ad atro-corinthiano-purpureis recedit.

This form differs from the typical form of the species in that the flowers are completely Indian Purple to Dark Corinthian Purple inside and out, except for a small white area in the throat.

The type of the form was originally discovered by the author in Paramus, Bergen County, New Jersey, in August, 1958, but this area was completely destroyed in creating a parking lot before the plant material could be collected and described. On August

20, 1960, the plant was rediscovered and collected by myself along a nameless rill east of the Bickford Pond -- Porter Road and west of Mill Brook, in Porter, Oxford County, Maine, and this logotype is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

The plant is named in honor of Robert Volk Keihner (1891—) as a token of appreciation for his many decades of teaching the sciences to the youth of the Hackensack (New Jersey) High School, the author included, and for giving so many of these young people countless hours of his own free time to further student interest and knowledge in the fields of nature and conservation.

The colors of the groundnut flowers have been variously described by authors, but few of these descriptions are, to an artist's eye, completely accurate. Utilizing COLOR STANDARDS AND COLOR NOMENCLATURE, by Robert Ridgway, to match the exact colors against the flowers of growing plants at Commack, Long Island, New York, at Ten Mile River Scout Camps, Narrowsburg, New York, at Salisbury, Massachusetts, at North Windham, Maine, and at East Limington, Maine, during the month of August, 1961, the colors of the typical form of the species were obtained as follows:

Outwardly, the corolla may be described as Vinaceous and Dark Perilla Purple, but to the non-artist the term purplish-brown would probably indicate generally more of a descriptive meaning. However, upon closer scrutiny, and by using the color charts referred to above, it will be discovered that the typical external color of the standard blends from Pale Vinaceous to Vinaceous, the tip White to Dull Green-yellow. The internal colors of the standard are Garnet-brown to Acajou Red, with the throat White and/or Pale Green-yellow. Both surfaces of the wings are Oxblood Red to Dark Perilla Purple, while the keel blends from Dark Vinaceous to Pale Dull Green-yellow or White.

To obtain the exact colors, the standard, wings, and keel had to be matched separately, that is, each part removed and color-tested without the other parts present to create a false tone. Each side of every flower-part was thus tested.

In checking the colors of many flowers, each color part may possess a dark or light blend of one color, though often slight, and these actually become two or more different colors with each bearing a different name, and this fact must be taken into consideration. Freshly opened and normally developed flowers only should be considered for a test, because flowers naturally fade, or darken, with age, as the case may be.

To check colors, test out of the sun, but in bright open shade, and during the late morning or early afternoon hours to obtain the most natural lighting. Hold the part of the flower to be tested downward so that additional and unwanted color does not show through from the other side to create a false color, and not directly against or too near the surface to create dark shadow. Medium gray-toned paper (i.e., Pale Smoke Gray) is an excellent type to use as a near background for the flower-parts to be tested.

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AVICENNIA NITIDA (NOMENCLATURE)

Elbert L. Little, Jr.

The common black-mangrove of tropical American shores has long been known as Avicennia nitida Jacq. Recently W. T. Stearn has proposed for this species the new combination A. germinans (L.) Stearn. However, the binomial A. germinans L. was validly published by Linnaeus nearly two hundred years earlier for a larger group with broader circumscription. Thus, A. nitida Jacq., in almost universal use for two hundred years, remains the correct name.

The nomenclature is of special interest, because this species is mentioned in numerous floras and publications about vegetation and forests, generally as A. nitida. Moldenke (Phytologia 7: 165-168, 179-181. 1960) cited many references.

This common species is the most widely distributed and hardiest of the New World mangroves. It extends the farthest north in the United States to Texas, Louisiana, and Mississippi, as well as to northern Florida, while the other three native mangrove species are restricted to southern and central Florida. On the Atlantic Coast this species ranges from Bermuda, Bahamas, and northern Mexico south to Brazil (Espirito Santo) and on the Pacific Coast from northern Mexico south to northern Peru and Galápagos Islands. The range is usually stated to include western Africa also. However, Moldenke (Phytologia 7: 149, 1960) refers the west African plants to A. africana P. Beauv., which is "admittedly very closely related."

The genus Avicennia L. was revised by R. C. Bakhuizen van den Brink (Revisio Generis Avicenniae (cum annotationibus diversis). Buitenzorg Jard. Bot. Bul. ser. 3, 3: 199-223, illus. 1921). A recent monograph is by Harold N. Moldenke (Materials toward a monograph of the genus Avicennia. I-III. Phytologia 7: 123-168, 179-232, 259-293. 1960). This genus usually is placed in the family Verbenaceae, though Moldenke and some others accept the segregate family Avicenniaceae with this single genus.

Avicennia L. (Sp. Pl. 110. 1753; Gen. Pl. ed. 5, 49. 1754) honors Abu Sina, or Avicenna (980-1036), of Bokhara, a distinguished Arabian physician and philosopher. The generic name was first proposed in 1735 by Linnaeus (Syst. Nat. ed. 1 (folio). 1735; ed. 2, 18. 1740) without description as a new name for Rheede's "Oepata RM" and was placed in Tetrandria Monogynia. In the generic description, Linnaeus (Gen. Pl. ed. 1, 27. 1737) cited Rheede's Hortus Indicus Malabaricus (4: t. 45. 1683) and

included this description of the seed, which was repeated in later editions (Gen. Pl. ed. 5, 49. 1754): "SEM: unicum, compressum, ellipticum, germinans intra pericarpium." Avicennia was mentioned also in other publications by Linnaeus (Flora Zeylanica 23. 1747; Materia Medica 42. 1749).

In 1753, the starting point of botanical nomenclature, the genus had a single species, A. officinalis L. (Sp. Pl. 110. 1753), of India. This name, according to W. T. Stearn (Kew Bul. 1958: 35. 1958), is to be typified by "Oepata" Rheede (1683) with restricted type-locality the coast of Cochin, southern India. The Linnaean Herbarium in London has specimens of this species and A. nitida, as cited by Spencer Savage (A catalogue of the Linnaean Herbarium. 225 p., illus. 1945). I have seen the new microfiches of these specimens and in 1956 photographed the two flowering specimens of A. nitida (813.1, 813.2).

The essential synonymy of the common New World black-mangrove is given below. Additional later synonyms were cited in the two monographs.

AVICENNIA NITIDA Jacq. black-mangrove

Bontia germinans L., Syst. Nat. ed. 10: 1122. 1759.
Avicennia nitida Jacq., Enum. Pl. Carib. 25. 1760; also Select. Stirp. Amer. Hist. 177, t. 112, fig. 1. 1763.
Avicennia tomentosa Jacq., Enum. Pl. Carib. 25. 1760; also Select. Stirp. Amer. Hist. 178, t. 112, fig. 2. 1763.
Bontia germinans L., Sp. Pl. ed. 2, 891. 1763 (in part).
Avicennia germinans L., Sp. Pl. ed. 3, 891. 1764(in part).
Avicennia germinans P. Br., Civ. Nat. Hist. Jamaica (ed. 2), Index I[p. 12], II[p. 7]. 1789.
Avicennia germinans (L.) Stearn, Kew Bul. 1958: 34. 1958.

All the works by Linnaeus and Jacquin cited above should be considered individually in chronological order. Linnaeus interpreted this species differently in each of four important books published within the five-year period 1759 to 1764.

Patrick Browne (Civ. Nat. Hist. Jamaica 263. 1756) called this species the olive mangrove tree, described it clearly in both Latin and English, observed that the seed "swells and germinates before it falls," and described the seed in Latin as follows: "Unicum quadrilobum germinans, lobis foliaceis." This work, which did not adopt binomial nomenclature, put this species doubtfully alone in the genus "BONTIA?". B. daphnoides L. was not mentioned.

The first binomial applied to the common black-mangrove of the New World was Bontia germinans L. (Syst. Nat. ed. 10, 2: 1122. 1759) as "A. B. fol.oppositis, pedunculis spicatis." Index Kewensis gave a later citation (L., Sp. ed. 2, 891. 1763)

and listed this name as a synonym of A. officinalis L. The genus Bontia [Plum.] L. (Sp. Pl. 638. 1753; Gen. Pl. ed. 5, 285. 1754), of Linnaeus's Didynamia Angiospermia and the family Myoporaceae, now has a single species, Bontia daphnoides L. (Sp. Pl. 638. 1753). In a family otherwise limited to the Old World, this species was described from Barbados and is found along shores in the West Indies and northern South America. The specimen of Bontia daphnoides in the Linnaean Herbarium (812.1) is sterile.

W. T. Stearn (A key to West Indian mangroves. Kew Bul. 1958: 33-37. 1958) noted that under Bontia germinans L. (1759) were two references, "Brown. jam. 263. Loefl. hisp. 193" the former from Jamaica and the latter probably from Cumaná, Venezuela. He stated that the name Bontia germinans L. is typified by Browne's specimen in the Linnaean Herbarium (813.2, filed under Avicennia). The bulk of Browne's plants were purchased by Linnaeus in 1758, according to Spencer Savage (A catalogue of the Linnaean Herbarium, p. vi. 1945). Donatia Loefl. (Iter. Hisp. 193. 1758) was published in a work without binomial nomenclature and apparently was a new name for Bontia, which was cited.

Jacquin in 1760 first placed this New World mangrove in the genus Avicennia. He distinguished two species, A. nitida Jacq. (Enum. Pl. Carib. 25. 1760; reprinted 1762) and A. tomentosa Jacq. (Enum. Pl. Carib. 25. 1760). The latter included an indirect reference to Bontia germinans as "Bontia Linn. syst. A. p. 1122" and another to Rheede. According to Moldenke (Phytologia 7: 185. 1960), Jacquin's types of both species, now in the British Museum of Natural History, represent variations of a single species.

Linnaeus in the second edition of his Species Plantarum (Editio Secunda. 1684 p. Holmiae, 1762-63) in the second volume (p. 890-891) suppressed his genus Avicennia and A. officinalis. Bontia had two species, and Bontia daphnoides (p. 890) of the Antilles now added Jacquin's first species (A. nitida) to the synonymy. B. germinans (p. 891) of the Indies now included a reference to Avicennia in the first edition as "Sp. pl. 1. p. 110", all the citations of A. officinalis from the first edition, Patrick Browne's Latin description, and Jacquin's second species (A. tomentosa). Linnaeus added that he reduced this species from Jacquin's personal observation.

Then Jacquin in his Selectarum Stirpium Americanarum Historia (1763) retained the genus Avicennia with enlarged Latin descriptions of his same two species. A. nitida Jacq. of Martinique was illustrated by a plate showing twig, leaves, fruit, and flower. A. tomentosa Jacq. of the Caribbean and neighboring continent was illustrated by a single obtuse leaf.

References under the second species included Browne, Loefling, and Linnaeus's description of Bontia germinans ("Linn. syst. A. p. 1122"). Jacquin observed that Linnaeus was confused ("confusus"). To point out the differences, he illustrated also the flower and fruit of B. daphnoides (t. 173, fig. 46).

The third edition of Species Plantarum (Editio Tertia. 1682 p. Vindobonae, 1764) followed soon after the second edition (1762-63) and was almost identical. Previously, I had regarded the third edition as a reprint of the second, and so states A Catalogue of the Works of Linnaeus (ed. 2, p. 45. 1933). I have examined two copies of this edition, which Bakhuizen van den Brink cited.

Bontia (p. 890) in the third edition was restricted to its original single species B. daphnoides of the Antilles excluding Jacquin's first species of Avicennia. Linnaeus restored his genus Avicennia (p. 891) with two species, A. nitida Jacq. and A. germinans of the Indies, and now under his Didynamia Angiospermia. A. germinans had almost the same synonymy as B. germinans (1763, not 1759) except for the omission of Linnaeus's descriptive phrase "BONTIA foliis oppositis, pedunculis spicatis." Instead, the first reference cited was "AVICENNIA foliis subtus tomentosis. Jacq. americ. 25. t. 112. f. 2." As before, there were cited "Avicennia. Fl. Zeyl. 57. Mat. med. 42. Sp. pl. 1. p. 110", Browne, Rheede, etc. From the citations, synonymy, and distribution, A. germinans included the Old World plants earlier named A. officinalis L. (1753). The listing of Avicennia in the index remained under Index Synonymorum as in the second edition and was not corrected to Index Generum.

In the sixth edition of his Genera Plantarum (1764), Linnaeus definitely reduced Avicennia Jacq. to synonymy under Bontia (p. 326), as shown indirectly in the second edition of his Species Plantarum (1763). According to the International Code of Botanical Nomenclature (Art. 13, Note 3. 1956), generic names in these two works are associated. The combined generic description of Bontia referred to the seed as "Nux ovalis, unilocularis, germinans." Linnaeus observed that he combined Avicennia and Bontia, both genera viviparous though with different corolla. In this work on genera, the species were not listed.

Then, in the Appendix of the same volume, the sixth edition of his Genera Plantarum (p. 579. 1764), Linnaeus restored and described the genus Avicennia again under his Didynamia Angiospermia. He listed two species, A. tomentosa Jacq. with "Bontia germinans. Sp. pl. 2. p. 891" as a synonym and A. nitida Jacq. of Martinique as removed from Bontia daphnoides. Thus, Linnaeus rejected his own epithet germinans.

Next, in a later edition of Systema Naturae (ed. 12, 2:426-427. 1767) and a reprint (ed.13, 2: 426-427. 1770), Linnaeus accepted Avicennia with 2 species A. tomentosa Jacq. and A. nitida Jacq. and Bontia with only B. daphnoides L. The same three species were accepted also by J. A. Murray (Linné, Systema Vegetabilium ed. 14, p. 579. 1784) and a later reprint (ed. 15, p. 579. 1797).

Finally, in Mantissa Plantarum Altera (p. 423. 1771), a supplement to Genera Plantarum (ed. 6) and Species Plantarum (ed. 2), Linnaeus retained Bontia daphnoides L. in its original circumscription excluding Jacquin's species, and accepted B. germinans excluding his own synonymy.

I wish to report that the binomial Avicennia germinans, which was omitted from Index Kewensis, was adopted also by Patrick Browne in the second edition of his Civil and Natural History of Jamaica (1789), published the year before his death. The first edition (1756) did not employ binomials, while the second edition, almost identical, according to the title page "added complete Linnaean indexes." The binomial Avicennia germinans as the Linnaean name without author appeared twice under Didynamia Angiospermia, on the twelfth unnumbered pages of Index I with Bontia and on the seventh unnumbered page of Index II with reference to Bontia on page 263. Avicennia germinans P. Browne (1789) thus is based upon Browne's description of the olive mangrove tree and his type specimen from Jamaica now in the Linnaean Herbarium (813.2), also the type of Bontia germinans L.

The confusion of the two unrelated genera Avicennia and Bontia by Patrick Browne and Linnaeus was odd. Browne (1756) correctly placed in genera the other three unrelated common species of mangroves in Jamaica. When he assigned his olive mangrove tree from Jamaica doubtfully to the West Indian Bontia, the genus Avicennia was known only from a single Old World species. In 1753-54 and earlier, Linnaeus put the two general in different classes. In 1764 he restored Avicennia from synonymy and placed it next to Bontia under his Didynamia Angiospermia.

Perhaps from Browne, Linnaeus became confused in attributing the viviparous or germinating habit of Avicennia with seeds in flattened greenish capsules to the genus Bontia, which has very different yellow ovoid pointed drupes with very long threadlike styles. Stamens are didynamous in Bontia and equal or subdidynamous in Avicennia. The latter has opposite leaves and flowers with short 4-lobed campanulate white or yellowish corolla, while Bontia has alternate leaves and flowers with longer 2-lipped yellowish corolla tinged with purple. Bontia, which has been called olive, grows as a high shrub along shores near

mangroves but has been planted elsewhere as an ornamental. One wonders if specimens might have become mixed.

Though omitted from Index Kewensis, Avicennia germinans L. was cited as a synonym of A. nitida Jacq. by Bakhuizen van den Brink in his monograph of the genus (p. 218). He accepted for this genus 4 species (1 with 5 varieties), among them A. officinalis L. and A. nitida Jacq. (with A. tomentosa Jacq. as a synonym.

Bakhuizen van den Brink (p. 200) traced the great confusion in the specific epithets to Linnaeus himself. Citing for Bontia germinans L. the 1763 reference as did Index Kewensis, he apparently overlooked the first publication of that name in 1759. He mentioned the "new name Avicennia germinans L." and explained:

"However, in the 3d edition of the Spec. Plant. (1764) p. 281, LINNAEUS ... gave again the generic name Avicennia, uniting Avicennia Flor. Zeyl. from Asia (called in 1753 A. officinalis L.) and Avicennia tomentosa JACQ. from America, under the new name Avicennia germinans L. Since LINNAEUS followed then JACQUIN'S data obviously (and actually had in his mind the American plant), the name A. germinans L. remains, notwithstanding the added quotations about the names of the Indian plants, as synonym to be attributed to A. tomentosa JACQ. from America. This fact was understood by LINNAEUS himself, who in the 6th edition of his Gen. Plant. (1764) p. 579 gave back to the American species its original name Avicennia tomentosa JACQ."

Harold N. Moldenke (The Verbenaceae and Avicenniaceae of Trinidad and Tobago. Lilloa 44: 283-336. 1939) cited as synonyms of Avicennia nitida Jacq. (p. 334) both A. germinans L. and Bontia germinans L. In the latest monograph of the genus, Moldenke(1960) adopted A. germinans (L.) Stearn and distinguished 11 species and a few varieties.

Following Moldenke, J. Francis Macbride adopted the name Avicennia germinans (L.) Stearn in his Flora of Peru (Field Mus. Nat. Hist. Bot. Ser. 13 (pt. 5, no. 2): 721. 1960).

Stearn in publishing the new combination Avicennia germinans observed that this name had been attributed to Linnaeus by Bakhuizen van den Brink and by Moldenke. However, he apparently overlooked the citation and comment by Bakhuizen van den Brink quoted above as well as Linnaeus's publication of this binomial.

The combination Avicennia germinans (L.) Stearn (1958) must be rejected because that binomial had been published twice before by Linnaeus (1764) and by Patrick Browne (1789).

The question to be settled now is the disposition of Avicennia germinans L. (Sp. Pl. ed. 3, 891. 1764). Is this a new name or a new combination? Is this binomial to be rejected or accepted and if so for what species? Bakhuizen van den Brink, quoted above, regarded this as a new name and rejected it. However, now more facts are known, and the rules of nomenclature have been changed.

The binomial Avicennia germinans L. following Bontia germinans L. suggests a new combination because the author repeated the epithet. In new combinations published before 1953, clear indication of the basionym and full reference to author and original publication are not required (Art. 32). In older works where there was no confusion or change in circumscription, some irregular new combinations have been accepted. A new combination based upon Bontia germinans L. (Syst. Nat. ed. 10, 2: 1759) would have the same type (Art. 55). The Code (Art. 55) might permit repetiion of an epithet as a new name in a second genus provided the conscription or type were the same and in spite of a synonym of intervening date in the second genus.

I conclude that Avicennia germinans L. must be regarded as a new name, not a new combination, and must be rejected as illegitimate (Art 64). First, Linnaeus in publishing Avicennia germinans L. (Sp. Pl. ed. 3. 891. 1764) cited neither Bontia germinans L. (Syst. Nat. ed. 10, 2: 1122. 1759) nor Bontia germinans L. (Sp. Pl. ed. 2, 891. 1763) and neither of these two earlier works containing this same epithet.

Likewise, Linnaeus in publishing Bontia germinans L. (1763) did not cite B. germinans L. (1759). As Index Kewensis cited only the later publication, the earlier was overlooked by other authors, for example by Bakhuizen van den Brink (1921), until brought to light by Stearn (1958). Thus, B. germinans L. (1763) could be treated as a new and different name from B. germinans L. (1759) and rejected as a later homonym. Then if Avicennia germinans L. were regarded as a new combination, there would be two possible basionyms. A. germinans has a conscription more nearly like that of B. germinans L. (1763) and with the latter as its basionym would stand as a new name in 1764.

Perhaps the most important evidence is Linnaeus's citation of his own earlier work. In publishing the name A. germinans L. (Sp. Pl. ed. 3, 891. 1764), Linnaeus cited neither reference with B. germinans L. but instead cited: "Avicennia. Fl. Zeyl. 57. Mat. Med. 42. Sp. pl. 1. p. 110." Those three references all are to the Old World species A. officinalis L. (Sp. Pl. 110. 1753), the only species of the genus published in 1753 and thus the type. Therefore, A. germinans L. (1764), which is based partly upon A. officinalis by Linnaeus's own citation, has the

same type, the Indian plant "Oepata" Rheede (1683) with restricted type-locality the coast of Cochin, southern India (Code, Appendix IV, 2, 3d).

A. germinans L. (1764) could not be regarded as a new combination under Article 55 (last paragraph) because Linnaeus deliberately cited a page reference to his different earlier name and at the same time made no reference to B. germinans L. 1759, 1763).

As a new name, A. germinans L. (1764) is illegitimate as nomenclaturally superfluous when published (Art. 64 (1)), because the taxonomic group as circumscribed by Linnaeus included the type of the older name and epithet A. officinalis L. (1753). In other words, Linnaeus when uniting two taxonomic groups from Old and New World should have retained the oldest legitimate name and epithet A. officinalis L. (Art. 57).

So far as I know, Linnaeus accepted A. germinans in only one obscure, overlooked edition of one work. He rejected this binomial in 1764, the year of its publication. The epithet germinans is not distinctive in the genus Avicennia, which was so characterized from the beginning in 1737, though could not be rejected for that reason.

Later authors, such as Willdenow (Sp. Pl. ed. 4, 3: 394-395. 1800) followed Linnaeus in accepting A. nitida and A. tomentosa instead of A. germinans. So far as I know, Patrick Browne was the only author before Stearn to take up A. germinans.

A. nitida Jacq. (1760) has been in almost universal use for about two hundred years. A. tomentosa Jacq. (1760), was published on the same page, is now generally treated as a synonym, being a pubescent variation. I do not know where these names were first united. However, A. tomentosa Jacq. is rejected as nomenclaturally superfluous when published, because its synonym included an indirect reference to Bontia germinans (Art. 64 (1)).

The simplest solution of the confused nomenclature is to regard A. germinans L. (1764) as an illegitimate new name for which A. officinalis L. (1753) should have been used. The specific epithet of Bontia germinans L. (1759) was priority over A. nitida Jacq. (1760) but cannot be reinstated as A. germinans P. Br. (1789) because the latter is a homonym of A. germinans L. (1764) (Art. 55 (1), 64 (2)).

Likewise, A. germinans (L.) Stearn (1958) could not replace A. nitida Jacq. (1760) because of the earlier homonym A. germinans L. (1764) and because of A. germinans P. Br., which is based upon the same type as A. germinans (L.) Stearn.

Thus, Avicennia nitida Jacq., the name in almost universal use for about two hundred years, remains the correct name for black-mangrove. Any attempt to revive the rejected, confused, and almost unused binomial A. germinans would serve no useful purpose. If application of the Code should be doubtful, then the interpretation should favor retention of the name established in usage.

However, as complete agreement may be lacking, the nomenclature merits further attention under Resolution 2, accepted by the plenary session of the Ninth International Botanical Congress, Montreal 1959 (Taxon 8: 245. 1959). This resolution invites persons "to send to the General Committee lists of plant names for w hich stabilization seems important, whether or not these names are now threatened ..." Avicennia nitida Jacq. is the name of an important species for which stabilization seems important and which is now threatened. Therefore, I am submitting this name for consideration. In the meantime, while action at the Tenth International Botanical Congress is pending, the name long established in usage should be retained.

Forest Service, United States Department of Agriculture, Washington, D. C.

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NOTES ON NEW AND NOTEWORTHY PLANTS. XXIX

Harold N. Moldenke

CALLICARPA ERIOCLONA var. PAUCINERVIA (Merr.) Moldenke, comb. nov.

Callicarpa paucinervia Merr., Philip. Journ. Sci. 9: 134—135. 1914.

CALLICARPA RANDAIENSIS var. KOREANA Moldenke, var. nov.

Haec varietas a forma typica speciei foliis subsessilibus anguste ellipticis parvis longe acuminatis, ad basin cuneato-acuminatis, supra basin minute adpresso-serrulatis utrinque glabris recedit.

This variety differs from the typical form of the species in having the leaves thin-membranous, very small, 2—4.5 cm. long, 7—14 mm. wide, narrowly elliptic, long-acuminate at the apex, cuneate-acuminate at the base, finely appressed-serrulate from below the middle to the base of the terminal acumination, glabrous on both surfaces.

The type of the variety was collected by Hyon Pia Chong at Wan-Do, Korea, on October 29, 1950, and is deposited in the herbarium of the University of California at Berkeley. The Korean name is said to be "chhom-chaksal-naeu".

HOLMSKIOLDIA SANGUINEA f. CITRINA Moldenke, f. nov.

Haec forma a forma typica speciei corollis calycibusque citrinoflavidis recedit.

This form differs from the typical form of the species in having its fresh corollas and calyxes the same lemon-yellow color, the older calyxes becoming greenish-yellow and drying light-brown.

The type of this handsome form was collected by Colin Potter (no. FL.1264) in outdoor cultivation in the Foster Botanical Garden, corner of Nuuanu and Vineyard Streets, Honolulu, Oahu, Hawaiian Islands, on September 20, 1961, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

LIPPIA ADOËNSIS var. PUBESCENS Moldenke, var. nov.

Haec varietas a forma typica speciei ramis ramulisque et laminis foliorum subtus dense pubescentibus recedit.

This variety differs from the typical form of the species in havings its stems and branches, as well as the under surface of the leaves, densely brown-pubescent.

The type of the variety was collected by B. B. Drummond and J. H. Hemsley (no. 4496) on a grassy hillside with scattered shrubs and shrub thickets, subject to burning, at Katera, altitude 1200 meters, Masaka District, Uganda, on October 1, 1953, and is deposited in the herbarium of the Botanisches Museum at Berlin.

STACHYTARPHETA KINGI Moldenke, sp. nov.

Herba erecta; caulibus crassis obtuse tetragonis sulcatis pilosis; ramis paucis abbreviatis gracilibus pubescentibus; foliis late ovatis acutis grosse crenatis, ad basin subtruncatis vel subcordatis, in petiolum elongatum breviter protractis, utrinque densiuscule puberulentis; spicis solitariis terminalibus dense multifloris congestis latis ubique dense breviterque pubescentibus, rhachide non incrassato; calicibus adscendente divergentibus.

Erect herb, branched toward the apex only; stems stout, stramineous, obtusely tetragonal, deeply sulcate toward the apex in drying, rather densely whitish-pilose, especially within the sulcations; branches few, short, slender, pubescent; principal internodes 7—15 cm. long; nodes not annulate; leaves decussate-opposite, often with very small ones on abbreviated branches in their axils; petioles slender, elongate, 1—4 cm. long, rather sparsely pilose; leaf-blades membranous, bright-green above, lighter beneath, rather broadly ovate, 6—8.5 cm. long, 3.5—7 cm. wide, rounded to mostly acute or very slightly subacuminate at the apex, coarsely and rather regularly serrate from the apex to almost the base, subtruncate or subcordate at the base and shortly cuneate-prolonged into the petiole, rather densely puberulent above, more densely so beneath; midrib slender, flat above, prominulous beneath; secondaries about 5 per side, slender, flat above, prominulous beneath, ascending, only the upper ones slightly arcuate; veinlet reticulation

fine, not very conspicuous on either surface; inflorescence terminal, spicate, solitary, densely many-flowered, to about 11 cm. long (or longer when in full anthesis or fruit); peduncles very short, about 1 cm. long, along with the rachis rather slender and tetragonal, densely short-pubescent, not incrassate nor excavated; bractlets linear, 9--11 mm. long, almost equaling the calyx, densely short-pubescent, subulate at the apex, rather conspicuous, often slightly arcuate; calyx tubular, about 12 mm. long, conspicuously 5-ribbed and -sulcate, densely short-pubescent on the outside, its rim 5-apiculate, two teeth about 4 mm. long and the other three 3 mm. long, erect; corolla hypocrateriform, lavender, its tube about equaling the calyx, the limb to 15 mm. wide, showy; fruit not seen.

The type of this handsome species was collected by Robert Merrill King (no. 877) -- in whose honor it is named -- in clay loam soil, in open sun, on a flat grazed area 6 km. northeast of Juchitán, along the Pan-American Highway (Route 190), at an elevation of less than 50 meters, among vegetation mainly of leguminous shrubs and cacti, Oaxaca, Mexico, on July 29, 1958, and is deposited in the herbarium of the University of Michigan at Ann Arbor.

VERBENA ARENARIA Moldenke, sp. nov.

Herba; caulibus multo ramosis; ramis gracilibus glanduloso-pubescentibus et longiore hirsutis, pilis albidis divergentibus; foliis oppositis laciniatis vel tripartito-laciniatis utrinque plusminusve hirsuto-pubescentibus; inflorescentiis capitatis demum paullo elongatis multifloris dense hirsutis breviter pedunculatis.

Herb, apparently low and wide-spreading; stem much branched; branches slender, subtetragonal, more or less densely glandular-pubescent and also whitish-hirsute with perpendicular hairs, less so in age; nodes somewhat annulate; principal internodes about 4 cm. long or sometimes abbreviated to 1.3 cm.; leaves decussate-opposite, thin-chartaceous, rather uniformly green on both surfaces, ovate in outline, irregularly laciniate-dentate or the larger ones sub-trifid or 3-lobed at the base, the lobes incised-dentate, more or less hirsute-pubescent on both surfaces, often with gland-tipped hairs, especially along the larger venation beneath, cuneately narrowed into a petiole which is 5--10 mm. long and scarcely distinguishable from the lamina-base; inflorescence axillary and terminal, capitate, slightly elongating in fruit, conspicuously hirsute throughout; peduncles very slender, short, about 2 cm. long, whitish-hirsute; heads many-flowered, dense; bractlets lanceolate, about 5 mm. long, about 1 mm. wide at the base, densely long-ciliate on the margins and puberulent elsewhere, about equaling the calyx; calyx tubular, 5--6 mm. long, densely short-pubescent and also sparsely hirsute with much longer divergent hairs, often somewhat glandulose; corolla hypocrateriform, blue, the tube about 10 mm. long, glabrous outside, the limb about 7 mm. wide.

The type of this species was collected by Santiago Venturi

(no. 2441) at Rio Lali, dept. Capital, Tucumán, Argentina, along the banks of the river, altitude 450 meters, on December 18, 1923, and is deposited in the United States National Herbarium at Washington.

x VERBENA ARGENTINA Moldenke, hybr. nov.

Herba hybrida V. cabrerae Moldenke et V. calliantha Briq. intermedia; foliis parvis ovatis incisis, inflorescentiis albostrigosis, pilis arcte adpressis.

Herb, probably a natural hybrid between V. cabrerae Moldenke and V. calliantha Briq., with the tomentum of the former and the leaves of the latter; stems apparently sprawling or decumbent, rooting at the nodes, branched from the base or near the base; branches slender, obtusely tetragonal, very sparsely scattered pilose with appressed hairs; leaves decussate-opposite, often with smaller ones on much abbreviated branchlets in their axils; petioles slender, 3--9 mm. long, rather sparsely strigose with antrorse hairs; leaf-blades chartaceous, somewhat lighter green beneath, ovate in outline, small, 1--2.5 cm. long, 1--2 cm. wide, irregularly incised-laciniate or the larger ones trifid at the base, the lobes 2-toothed, rather sparsely short-strigose on both surfaces with inconspicuous appressed antrorse hairs, cuneately narrowed at the base into the petiole; venation somewhat prominulous beneath; inflorescence terminal, solitary, spicate, long-pedunculate; peduncles slender, 5.5--7.5 cm. long, sparsely pilosulous-strigose with antrorse hairs; rachis densely spreading-pubescent; bractlets lanceolate-ovate, short, about 3 mm. long, much shorter than the calyx, acuminate, densely long-ciliate on the margins from the base to the mid-point; calyx tubular, 7--9 mm. long, densely white-strigose with closely appressed antrorse hairs, 5-apiculate at the apex, two of the apiculations longer than the other three; corolla hypocrateriform, its tube about 14 mm. long, glabrous outside, the limb about 12 mm. wide.

The type of this hybrid was collected by Santiago Venturi (no. 14) at Mocovi, Santa Fecino, Chaco, Argentina, on September 14, 1903, and is deposited in the United States National Herbarium at Washington.

VERBENA NIVEA f. ROSEA Moldenke, f. nov.

Haec forma a forma typica speciei corollis roseis recedit.

This form differs from the typical form of the species in having rose-colored corollas.

The type of the form was collected by Santiago Venturi (no. 10111) in waste land between pastures, at 3800 meters altitude, Cumbre del Cajon, dept. Taffí, Tucumán, Argentina, on April 20, 1926, and is deposited in the United States National Herbarium at Washington.

A NEW COLOR FORM OF GROUNDNUT FROM NEW YORK

Fred W. Oswald

APIOS AMERICANA f. M^{c}CULLOUGHI Oswald, f. nov.

Haec forma a forma typica speciei recedit coloribus exterioribus vexilli pallido-purpureo-griseis vel pallido-vinaceo-griseis marginibus Acajou-rubris flocculosis, coloribus interioribus vexilli maroccano-rubris vel atro-rubris.

This form differs from the typical form of the species (cfr., Phytologia, Vol. 8, no. 1, p. 48) in that the external colors of the standard are Pallid Purple-drab to Pale Vinaceous-drab, flaked about the edges with Acajou Red, while the internal colors of the standard are Morocco Red to Maroon. Both surfaces of the wings are Victoria Lake to Maroon, while the keel is Pale Vinaceous-lilac to Deep Purplish Vinaceous. The calyx is Acajou Red instead of green.

This plant was collected by myself on the west side of Davis Lake, also known as Davis Pond, in the Delaware Section of Ten Mile River Scout Camps, Town of Tusten, Sullivan County, New York, on August 22, 1961, and the type specimen is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

The plant is named in honor of Robert George McCullough (1910—) as a token of appreciation for giving, over many years, countless hours of his own free time to bring the wonders of nature and the principles of conservation to the Boy Scouts of the Greater New York Councils, and elsewhere. In 1926, as a Boy Scout, he received the Eagle Award from Lord Baden-Powell, the founder of Scouting. In 1925 he received the Hornaday Award for conservation, and, in 1957, the Hornaday Medal. In 1960, for outstanding service to boyhood, he was awarded the Silver Beaver.

It seems fitting, then, that this new form which was discovered in a Greater New York Council Scout Camp, should be named for a man who has lived Scouting much of his life.

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ADDITIONAL NOTES ON THE GENUS VITEX. II

Harold N. Moldenke

VITEX Tourn.

Additional and emended literature: Mann, Enum. Haw. Pl. 194. 1867; Drake del Castillo, Fl. Polynés. Franç. 151. 1893; Guillaumin, Ann. Mus. Colon. Marseille 9: 66 & 205. 1911; E. D. Merr., Enum. Born. Pl. 514. 1921; S. Moore in Rendle, Journ. Bot. Lond. 63: Suppl. 81. 1925; Neal, In Gard. Hawaii 635 & 641—643, fig.

275. 1948; O. & I. Degener, Pac. Disc. 14 (5): 15. 1961; F. Miranda, Bol. Soc. Bot. Mex. 26: 142, 144, 148, 152, 167, 172, & 175. 1961; Moldenke, Phytologia 8: 21--47. 1961.

VITEX ACUMINATA R. Br.

Additional literature: F. M. Bailey, Compreh. Cat. Queensl. Pl. 386, fig. 362. 1913; Moldenke, Phytologia 8: 24. 1961.

Illustrations: F. M. Bailey, Compreh. Cat. Queensl. Pl. fig. 362. 1913.

VITEX AGNUS-CASTUS L.

Additional literature: Moldenke, Phytologia 8: 24--26. 1961.

The Raizada 85 cited in Phytologia 5: 187 (1955) as the typical form of this species appears, on further examination, to be var. pseudo-negundo Hausskn. instead.

Additional citations: ITALY: Savi 1995 (B). UNION OF SOCIALIST SOVIET REPUBLICS: Transcaspia: Michelson 87 (N, N). Turkmanskaya: Litwinow 2407 (N); Zapriagaev 1 (N). CULTIVATED: Texas: P. O. Schallert 365 (S).

VITEX AGNUS-CASTUS var. PSEUDO-NEGUNDO Hausskn.

Additional literature: Moldenke, Phytologia 8: 27. 1961.

This variety has been collected at altitudes of 1200 to 1600 meters. The Raizada 85, cited below, was incorrectly cited by me in Phytologia 5: 187 (1955) as typical V. agnus-castus L.

Additional citations: IRAN: Rechinger & Rechinger 5778 (B). BALUCHISTAN: Rechinger & Rechinger 3996 (B). CULTIVATED: India: Raizada 85 (N).

VITEX ALTISSIMA L. f.

Additional literature: Moldenke, Phytologia 8: 28. 1961.

The corollas of this species are described as violet, and it has been found in anthesis in August. According to Subraymanyam the wood is used in Andhra for making agricultural implements.

Additional citations: INDIA: Andhra: Subraymanyam 6374 (B).

VITEX BARBATA Planch.

Additional literature: Moldenke, Phytologia 5: 355. 1956.

Additional citations: MALI: Soudan: Jaeger 2402 (Z), 2448 (Z), 5032 (Z), 5779 (Z).

VITEX BUCHANANII J. G. Baker

Additional literature: Moldenke, Phytologia 8: 29. 1961.

Schlieben describes this as a tree 6--8 m. tallm with white flowers, growing in parklands.

Additional citations: TANGANYIKA: Schlieben 6008 (B).

VITEX COMPRESSA Turcz.

Additional literature: Moldenke, Phytologia 8: 34. 1961.

Additional citations: SURINAM: Wood Herb. Surin. 349 (N).

VITEX DONIANA Sweet
Additional literature: Moldenke, Phytologia 8: 35--36. 1961.
Additional citations: MALI: Soudan: Jaeger 3377 (Z).

VITEX FERRUGINEA Schum. & Thonn.
Additional literature: Moldenke, Phytologia 5: 334--335. 1955.
Additional citations: CONGO: Corbisier-Balanot 1293 (B).

VITEX GAMOSEPALA Griff.
Additional literature: Moldenke, Phytologia 8: 37--38. 1961.
Collectors describe this as a shrub 5 m. tall or a tree 10 m. tall, scattered in evergreen forests, with yellow flowers in July and October.
Additional citations: THAILAND: Thaworn 483 [Herb. Roy. Forest Dept. 23012] (Bk, Z), 756 [Herb. Roy. Forest Dept. 15001] (Bk, Z).

VITEX GAMOSEPALA var. SCORTECHINII King & Gamble
Additional synonymy: Vitex gamosepala var. scortechini King & Gamble ex S. Moore in Rendle, Journ. Bot. Lond. 63: Suppl. 81. 1925.
Additional literature: Moldenke, Phytologia 5: 366. 1956.

VITEX GAUMERI Greenm.
Additional literature: Moldenke, Phytologia 8: 38. 1961; F. Miranda, Bol. Soc. Bot. Mex. 26: 152, 167, 172, & 175. 1961.
Miranda records the additional vernacular names "carrete", "crucillo", and "yashnike" for this species.
Additional citations: HONDURAS: Morazán: Williams & Molina 10271 (B).

VITEX GLABRATA R. Br.
Additional literature: F. M. Bailey, Compreh. Cat. Queensl. Pl. 386. 1913; Moldenke, Phytologia 8: 39. 1961.
Bailey, in the reference cited above, records the additional common name "ko-na-ru".

VITEX KENIENSIS Turrill
Additional literature: Moldenke, Phytologia 8: 41. 1961.
Recent collectors describe this plant as a small tree, about 6 m. tall; trunk about 15 cm. in diameter at breast height; bark gray-brown; calyx pilose with yellow-brown hairs; corolla yellowish outside, white inside, the lower lip purplish-violet; anthers yellow-brown; stigma light-green; unripe fruits green, flushed with brown, white-dotted. It has been found in grass-covered glades with scattered trees or tree-clumps of Erythrina and others, at an altitude of 1600 meters, flowering and fruiting in September.
Additional citations: KENYA: Maas-Geesteranus 6282 (S).

VITEX LONGISEPALA King & Gamble
Additional literature: Moldenke, Phytologia 8: 43. 1961.

Recent collectors describe this plant as a medium-sized tree, growing in evergreen jungles, with yellow flowers in February.

Additional citations: THAILAND: Premrasmi s.n. [Herb. Roy. Forest Dept. 3266] (Z).

VITEX LUCENS T. Kirk

Additional literature: Neal, In Gard. Hawaii 643. 1948; Moldenke, Phytologia 8: 43—44. 1961.

Laing & Blackwell report that the wood of this tree is valuable for ship-building since it is not injured by dampness or exposure. However, logs of this wood are often perforated by the larvae of the Puriri Moth, which destroy the wood value. The tree is a surface-rooter, and is often blown over by gales. It is endemic and restricted to the northern part of North Island, New Zealand, but is easily cultivated elsewhere.

VITEX MONROVIANA Pieper

Additional literature: Moldenke, Phytologia 8: 47. 1961.

Additional citations: LIBERIA: Dinklage 2194 (B—isotype, B—isotype), 3058 (B).

VITEX MOSSAMBICENSIS Gürke

Additional literature: Moldenke, Phytologia 5: 485. 1957; Moldenke, Résumé 145, 151, & 477. 1959.

Additional citations: TANGANYIKA: Schlieben 5792 (B).

VITEX MOSSAMBICENSIS var. OLIGANTHA (J. G. Baker) Pieper

Additional synonymy: Vitex mossambicensis var. oligantha (Gürke) Pieper, in herb.

Additional literature: Moldenke, Phytologia 5: 485—486. 1957; Moldenke, Résumé 145, 387, & 477. 1959.

The Schlieben 5792 identified as this variety appears to be the typical form of the species.

VITEX NEGUNDO L.

Additional synonymy: Vitex negundo Royle ex H. J. Lam, Verbenac. Malay. Arch. 369, in syn. 1919. Vitex negunda L., in herb.

Additional literature: Campbell & Watt, Descrip. Cat. Econom. Prod. Chutia Nagpur 39. 1886; Guillaumin, Ann. Mus. Colon. Marseille 9: 66 & 205. 1911; E. D. Merr., Enum. Born. Pl. 514. 1921; E. L. D. Seymour, New Gard. Encycl. 1292. 1944; Neal, In Gard. Hawaii 641 & 643. 1948; Hansford, Reinwardtia 3: 75—112. 1954; Biol. Abstr. 30: 1418. 1956; Santapau, Fl. Purandhar 104. 1957; Moldenke, Phytologia 5: 486—498 and 6: 14. 1957; Biol. Abstr. 30: 4370. 1958; Moldenke, Am. Midl. Nat. 59: 365. 1958; Moldenke, Résumé 14, 62, 111, 145, 151, 157—159, 164, 167, 171—174, 177, 181, 185, 186, 191, 193, 198, 225, 232, 237, 302, 320, 321, 380, 381, 383, 385—390, 427, & 477. 1959; Moldenke, Résumé Suppl. 1: 11. 1959.

The Poilane 1474 specimen in the Berlin herbarium has the lower leaves conspicuously toothed, but the upper ones entire. San-

tapau reports that this species is now growing "all over the hill at Purandhar", but was possibly originally planted in gardens there as a hedge. Campbell & Wall, in the reference cited above, report the ashes of the wood being used in dyeing and the roots and leaves used medicinally in Chutia Nagpur. Singh, Lete, and Lau also report the species as being used in medicine.

Polunin, Sykes, & Williams describe the calyx as white and the corolla mauve. They found it growing at 2500 meters altitude in Nepal. Hansford, in the reference cited above, describes a new species of fungus, Irenina depokensis Hansford, from this plant in Indonesia. Guillaumin cites a Pennel 300 not yet seen by me.

The Conklin s.n. [Mt. Yagaw, May 4, 1953], distributed as this species, is actually V. trifolia L., while Brass 28095 is V. trifolia var. bicolor (Willd.) Moldenke, and Chiao 1879 is V. negundo var. intermedia (P'ei) Moldenke. Clemens 5924 is host to a species of Cronartium fungus. Tsui 617 seems to be in part the typical form of this species and in part var. intermedia.

Lau describes this plant as "semi-woody, 1 m. diam.", and Merrill says that it is "widely distributed in Old World tropics". Rock 10465 presents much the appearance of f. alba P'ei.

Lei reports the species as fairly common on dry level land as scattered shrubs on sandy soil on Hainan Island, while Lau says that it is abundant in dry sandy soil as scattered shrubs along roadsides. Rodin found it common along streambanks in cultivated valleys and hills of sparse vegetation in Pakistan. Other recent collectors encountered it at the sides of hedges, near ravines, on mountainsides or sandy banks, in thickets, near streams, in wastelands, and in waste places near villages. The corolla is said to be bluish, violet, "purplish-white with deep purple", or even white (Tak & Chow 2856). The plant is said to be a small tree with "fragrant" or "ill-smelling" flowers. It has sometimes been distributed in herbaria as var. incisa (Lam.) C. B. Clarke. The Allard 11390 cited below does not bear on its label any indication that it came from cultivated material, but I am assuming that it did. The additional common name "samaloo" is recorded.

Additional citations: FLORIDA: Polk Co.: McFarlin 6112 (Mi). BALUCHISTAN: Harsukh s.n. [Duthie 20615] (Ca--294806). PAKISTAN: Swat: S. Ali s.n. [10.8.52] (Vi); Rodin 5427 (Ca--36603). NEPAL: Polunin, Sykes, & Williams 5833 (Bm). INDIA: East Punjab: Koelz 1626 (Mi), 4137 (Mi); Nasir s.n. [R. R. Stewart 14743b] (Ca--972843). Madras: Janaki 776 (Mi). United Provinces: Kaul 97 [fls. June 3, 1922] (Ca--228229), 97 [fr. Nov. 1, 1922] (Ca--228229); U. Singh 216 (Ca--361112). West Bengal: Hosein s.n. [Chandernagore, 1902] (B). State undetermined: K. Singh 5-76 [Bindalnala] (Ca--304520); Wight s.n. [Peninsula Ind. Orientalis] (Ca--182991). CHINA: Anhwei: Herb. Univ. Nanking 1726 (Vi); Ling 1307 [Herb. Univ. Nanking 7845] (Ca--258772). Chekiang: Cheo & Wilson

227 [Herb. Univ. Nanking 12873] (Ca--316391, Ca--354641); Ching 2429 (Ca--281814); A. N. Steward s.n. [Herb. Univ. Nanking 2387] (Ca--230043). Fukien: H. H. Chung 1073 (Ca--225837), 3452 (Ca--420344). Hupeh: Sun 10b (N). Kiangsi: Ip 85 [Herb. Univ. Nanking 7698] (Ca--258860). Kwangsi: Ching 5450 (Ca--409697). Kwangtung: S. Y. Lau 699 (N), 20133 (Ca--611460); Tak & Chow 2856 [Herb. Canton Chr. Coll. 14717] (Ca--319390); Tso 20940 (N); Tsui 617, in part (Ca--612416, Ca--882867); Ying 975 (Ca--358924). Szechuan: Fang 9122 (Du--333631, N), 9277 (Du--333626, N). Yunnan: A. Henry 13210 (N), s.n. [Yunnan] (N, N--photo); J. F. C. Rock 10465 (Ca--327451). AMOY ISLAND: A. N. Steward 3137 (Ca--44741), FORMOSA: H. H. Bartlett 6267 (Ca--325501); Hayashi 21212 (Ca--344512); A. Henry s.n. [Takow] (N); Tanaka & Shimada 17878 (N). HONGKONG: C. Ford s.n. (N). LANTAU ISLANDS: Taam 1728 (B, Ca--82278). HAINAN ISLAND: W. Y. Chun 1849 [Herb. Univ. Nanking 6915] (Ca--242587); Chun & Tso 43701 (Ca--594864); S. K. Lau 293 (B, Ca--525009, N), 1209 (N); C. I. Lei 202 (B, N), 700 (B, Ca--612480, N); Liang 64661 (N); May 123 (Ca--373948); Tsang 622 [Herb. Lingnan Univ. 17371] (B); Wang 33162 (N). INDOCHINA: Annam: Poilane 1474 [Herb. Chevalier 1439] (B, Ca--53752). Cochinchina: Godefroy s.n. [Environs de Saigon, 1875] (Ca--54799); Thorel 120 (B). State undetermined: Petelot 1170 [Cho Gouh] (Ca--227746). MALAYA: Penang: Haniff 239 (Ca--355089). PHILIPPINE ISLANDS: Luzon: Clemens 5429 [Herb. Philip. Bur. Sci. 15774] (Ca--252524, Ca--268412); M. S. Clemens 16803 (Ca--285344); Elmer 5611 (N), 8125 (N), 18119 (Ca--271404, N); Haenke 80 (Ca--280935); Langlassé 72 (B); Lete 173 (Ca--304962); Mangubat s.n. [Herb. Philip. Bur. Sci. 1343] (N); R. C. McGregor s.n. [Herb. Philip. Bur. Sci. 43531] (Ca--237688); E. D. Merrill 1503 (N), 1636 (N), 2320 (N), 2876 (N), 3429 (N), 3627 (N), Sp. Blanc. 440 (N); Vanoverbergh 1397 (Vi). SUMATRA: D. Fairchild 1078 (Ca--301280). SARAWAK: Mjöberg 234 (Ca--234204). CULTIVATED: Hawaiian Islands: A. R. Moldenke 89 [H. N. Moldenke 21849] (Z). India: J. O. Voigt s.n. (S). Indochina: Clemens & Clemens 3804 (Ca--339305); Pierre 389 (B, Ca--53750). Virginia: H. A. Allard 11390 (Ca--793722).

VITEX NEGUNDO f. ALBA P'ei

Additional literature: Moldenke, Phytologia 5: 498--499. 1957; Moldenke, Résumé 171 & 477. 1959.

Collectors describe this plant as a shrub, 4--6 feet tall, with persistent aromatic foliage, inhabiting open scrub at altitudes of 9000 to 10,000 feet. Maire B.3663 has the leaflets toothed like thosein var. intermedia (P'ei) Moldenke. It has been distributed in herbaria as V. negundo L.; on the other hand, Rock 10465, cited by me as typical V. negundo, may be f. alba instead.

The form has been found in anthesis also in May.

Additional citations: CHINA: Yünnan: Forrest 10123 (Ca--231076--cotype); Maire B.3663 (Ca--386972); J. F. C. Rock 3880 (Ca--327013--cotype), 5055 (Ca--327933--cotype), 9044 (Ca--327842--cotype).

VITEX NEGUNDO f. LAXIPANICULATA P'ei

Additional literature: Moldenke, Phytologia 6: 20. 1957; Moldenke, Résumé 171 & 477. 1959.

The flowers are said to be blue or white, blossoming in June at altitudes of 3 to 900 meters.

Additional citations: CHINA: Yünnan: A. Henry 13210 (N--cotype); Maire 6254 (Ca--386802--cotype); Yen 31 (Ca--487585).

VITEX NEGUNDO var. CANNABIFOLIA (Sieb. & Zucc.) Hand.-Mazz.

Additional literature: Neal, In Gard. Hawaii 642. 1948; Moldenke, Phytologia 5: 499--502 and 6: 14. 1957; Moldenke, Résumé 78, 132, 164, 171, 173, 174, 178, 191, 225, 361, 381, 382, 385, 387, & 477. 1959; Moldenke, Résumé Suppl. 1: 11. 1959.

Recent collectors describe the flowers as lavender or mauve and the leaves as glaucous beneath. It has been found in anthesis also in April and May, and in fruit in July, inhabiting rocky slopes from 500 to 2200 meters altitude and open mountainsides. An additional common name is "hemp-leaved vitex".

Additional citations: NEPAL: Stainton, Sykes, & Williams 2737 (Bm). CHINA: Chekiang: Cheo & Wilson 78 [Herb. Univ. Nanking 12724] (Ca--354601, Ca--316390). Fukien: L. Y. Tai 11712 (Um--173). Kiangsu: Herb. Univ. Nanking 659 (Ca--230042); Ling 2382 [Herb. Univ. Nanking 12334] (Ca--316390). Shantung: Chiao 2704 (B). Szechuan: Fang 5279 (Du--333777). CULTIVATED: New York: Moldenke & Moldenke 11865 (N).

VITEX NEGUNDO var. HETEROPHYLLA (Franch.) Rehd.

Additional and emended synonymy: Vitex negundo Curtis apud Rehd. in Sarg., Pl. Wils. 3: 33, in syn. 1916 [not V. negundo L., 1753]. Vitex incisa Bunge apud Rehd., Man. Cult. Trees, ed. 1, 777, in syn. 1927 [not V. incisa Thunb., 1947, nor Wall., 1895]. Vitex negundo var. incisa Clarke ex Moldenke, Résumé 387, in syn. 1959.

Additional literature: Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; Moldenke, Phytologia 5: 502--507 and 6: 14--15. 1957; Moldenke, Résumé 15, 26, 30, 74, 167, 171, 185, 225, 232, 302, 382, 384--387, 389, & 477. 1959.

Recent collectors describe the flowers as pinkish, grayish-blue, or purple, and encountered the plant in open dry loess, under pines, and on terrace walls in mountains, ascending to 5500 feet altitude. Herbarium material has been distributed as typical V. negundo L.

Additional citations: CHINA: Hopeh: Mrs. W. Granger s.n.

[Pei T'ai Ho] (Ca--378238); Herb. Inst. Bot. Acad. Sin. 256 (S), 299 [277] (S), 341 [278] (S); T. F. Li 63 [Herb. Univ. Nanking 10897] (Ca--299830); F. N. Meyer 1008 (Ca--180786). Shansi: Ling 1467 [Herb. Univ. Nanking 9113] (Ca--263675), 1721 [Herb. Univ. Nanking 9366] (Ca--266638), 1741 [Herb. Univ. Nanking 9386] (Ca--266650). Shantung: Chiao 3052 (B, Mi). CULTIVATED: Germany: Heiland s.n. (B). Massachusetts: Herb. Jesup s.n. [Camb. Bot. Gard., 1877] (Dt, Dt); Rehder s.n. [Aug. 5, 1898] (B). Oklahoma: Duff 101 (Ok); O. M. King s.n. [June 21, 1955] (Ok); D. McLean 86 (Ok). Virginia: H. A. Allard 11390 (Gg--381231).

VITEX NEGUNDO var. INTERMEDIA (P'ei) Moldenke

Additional literature: Alain in León & Alain, Fl. Cuba 4: 318. 1957; Moldenke, Phytologia 6: 16--20. 1957; Lombardo, Arb. Cult. Pas. Pub. 47 & 255--256. 1958; Moldenke, Résumé 14, 30, 53, 60, 63, 131, 158, 165, 171, 172, 174, 178, 188, 191, 198, 225, 380, 384, 386, 387, & 477. 1959.

Illustrations: Lombardo, Arb. Cult. Pas. Pub. 255. 1958.

Recent collectors describe the foliage as aromatic, the corollas as light-purple or "white and purple", and the fruit (immature) as greenish. They found the plant in partial shade of mixed woods, in mountain forests, and on open ridges, ascending to 2800 meters altitude. Herbarium material has been misidentified and distributed as V. cannabifolia Sieb. & Zucc. The Cheng 1653 cited below was collected on the campus of Fukien Christian College and so may have come from cultivated material. Ying 1263 looks very much like typical V. negundo L., while Young 3236 approaches var. heterophylla (Franch.) Rehd.

Additional citations: INDIA: East Punjab: Koelz 4592 (Mi). United Provinces: Gill 35 (B). CHINA: Anhwei: Herb. Univ. Nanking 1726 (Ca--230044); Ling 1309 [Herb. Univ. Nanking 7847] (Ca--258774). Fukien: Chang & Metcalf 275 (Ca--249191); C. H. Cheng 1653 (Ca--563707), 1711 (Ca--287025); H. H. Chung 2371 (Ca--233089, Ca--420367); Metcalf & Chang 31 (Vi). Honan: A. N. Steward 1603 [Herb. Univ. Nanking 9729] (Ca--270649). Kiangsu: S. N. Lei s.n. [Herb. Univ. Nanking 2990] (Ca--225100); Ren & Tao 27 [Herb. Univ. Nanking 12581] (Ca--299863); G. D. Wilder s.n. [Herb. Univ. Nanking 10729] (Ca--280986); Young 3236 (Ca--382758). Kwangtung: Peng, Tak, & Kin 671 [Herb. Canton Chr. Coll. 12670] (Ca--274996); Tsui 453 (Ca--612522); Ying 1059 (Ca--358965), 1263 (Ca--360145). Sikang: Chiao 1879 (Ew). Yunnan: Maire 1776 (Ca--222892); J. F. C. Rock 6981 (Ca--262235). Province undetermined: David 833 [Hiokiang] (Ca--192799). HONAM ISLAND: E. D. Merrill 10073 (Ca--992434). THAILAND: Zimmermann 2 (B, B). JAVA: Bakhuizen van den Brink 1645 (Ca--234989). CULTIVATED: California: McCaskill 346 (Ca--53310, Gg--403501).

VITEX ORINOCENSIS var. MULTIFLORA (Miq.) Huber

Additional literature: Moldenke, Phytologia 6: 27—31. 1957; Moldenke, Résumé 69, 74, 76—78, 85, 111, 112, 226, 386, 387, & 477. 1959.

Bernardi records the vernacular name "aceituno" and calls the plant a riparian tree. The corolla is described by recent collectors as blue-lilac or purple. The tree has beenfound fruiting in May.

Additional citations: VENEZUELA: Amazonas: Maguire & Wurdack 34759 (N, S). Barinas: Bernardi 6849 (N). Bolívar: Bernardi 2915 (Ad); Ll. Williams 13295 (Ew). Federal District: Aristeguieta 2801 (N). SURINAM: Florschütz & Florschütz 1228 (N); Lanjouw & Lindeman 1862 (N), 1983 (N). BRAZIL: Amazonas: Murça Pires & Black 969 (Ut—98028a, Z). Maranhão: Fróes 1952 (Mi). CULTIVATED: Brazil: Bot. Gard. Goeldi tree 719 (Bm).

VITEX OXYCUSPIS J. G. Baker

Additional literature: Moldenke, Phytologia 6: 31—32. 1957; Moldenke, Résumé 137, 138, 143, 148, 426, & 477. 1959; Moldenke, Résumé Suppl. 1: 9. 1959.

The species is described by Peter as a tree or treelet, to 6 m. tall, with white flowers, blooming in December, and found at altitudes of 860 to 1000 meters, but Small says it is a tree 80 feet tall, with smooth powdery mustard-colored bark. It has been misidentified in herbaria as V. madiensis Oliv., V. madiensis var. angustifolia Pieper, and as V. madiensis var. schweinfurthii (Gürke) Pieper.

Additional citations: SIERRA LEONE: D. Small 613 (B). TANGANYIKA: A. Peter 17900 [O.IV.108] (B), 18138 [O.IV.115] (B), 18833 [O.IV.136] (B), 20249 [O.IV.183] (B), 21764 [O.IV.231] (B, N), 23046 [O.IV.279] (B), 39654 [V.209] (B).

VITEX PACHYPHYLLA J. G. Baker

Additional literature: Moldenke, Phytologia 6: 33—34. 1957; Moldenke, Résumé 140 & 477. 1959.

Herbarium material of this plant has been misidentified as V. obovata E. Mey. and as V. cienkowskii Kotsch. & Peyr.

Additional citations: GABON: Debeaux 416 (B); Klaine 2856 (N). CONGO BRAZZAVILLE: Lecomte s.n. [Fernand-Vaz, Avril 1892] (Ca—54407).

VITEX PADANGENSIS H. Hallier

Additional literature: Moldenke, Phytologia 6: 34. 1957; Moldenke, Résumé 188 & 477. 1959.

This is said to be a tree 70 feet tall, with a trunk 1 foot in diameter, growing on red soil in virgin forests, fruiting in November and December.

Additional citations: SUMATRA: Krukoff 4339 (Ca—534213).

VITEX PANSHINIANA Moldenke

Additional literature: Moldenke, Phytologia 6: 34—36. 1957; Moldenke, Résumé 111 & 477. 1959.

Macedo found this species blooming in July. It has been misidentified in herbaria as V. polygama Cham. by G. M. Barroso.

Additional citations: BRAZIL: Goyaz: Macedo 3897 (W—2248967, W—2248968).

VITEX PARVIFLORA A. L. Juss.

Additional literature: Neal, In Gard. Hawaii 643. 1948; Moldenke, Phytologia 6: 36—41. 1957; Alain in León & Alain, Fl. Cuba 4: 318. 1957; Moldenke, Résumé 59, 185, 191, 192, 195, 196, 198, 200, 203, 226, & 477. 1959; Menninger, Trop. Tree Seeds [2]. 1961.

Elmer describes this as a low widely spreading tree in sand-gravelly soil of open or lightly wooded places along river flats, the trunk 12 inches in diameter, burly, subterete, suberect, branched from below the middle, the wood hard, heavy, burly, dingy white, the heartwood yellowish, odorless, tasteless, the bark thick, yellowish (even the thinly scaling surface), the branches forming a flat crown; leaves smooth, horizontal or drooping, subcoriaceous, usually conduplicate; inflorescence suberect, terminal, the green stalks becoming purplish-tinged; flowers erect, deciduous, violaceous, slightly odorous.

Recent collectors describe this as a large spreading tree to 20 meters tall, 30—60 cm. in diameter at breast height, with violet corollas, blooming also in December, inhabiting forests, streamsides in forests, and highway banks, to 1200 meters altitude. Additional common names are "blue vitex" and "tupas". Quisumbing reminds us that this tree furnishes the "molave" wood of commerce, used for posts and construction. The Loher s.n. [Rizal Prov.] distributed as this species is V. altmanni Moldenke.

Additional citations: PHILIPPINE ISLANDS: Luzon: Bawan s.n. [Herb. Philip. Forest Bur. 24602] (Ca—238972); Cenabre s.n. [Herb. Philip. Forest. Bur. 31357] (Mi); M. S. Clemens 19006 (Ca-295741), s.n. [Bulacan Province, Sept.-Nov. 1924] (Ca—268139); Elmer 17286 (Ca—272333, Um—168), 18089 (Ca—270776); G. Edaño s.n. [Herb. Philip. Bur. Sci. 48764] (Ca—321808); Haenke 75 (Ca—280927); Hagger 255 (Ca—70314); Loher 12490 (Ca—243058), s.n. [Sumag, May 1914] (Ca—229200); Quisumbing 2210 (Ok—17246), s.n. [Mt. Maguiling, July 1925] (Ca—299794); Sulit & Canicosa s.n. [Los Baños, Laguna Province, March 1926] (Ca—308189). Mindanao: Ablaza 73 [Herb. Philip. Forest. Bur. 30281] (Ca—321048); F. Cruz s.n. [Herb. Philip. Forest. Bur. 23893] (Ca—205896); Elmer 13440 (Ca—272778); D. P. Miranda s.n. [Herb. Philip. Forest. Bur. 20573] (Ca—195673); Phasis s.n. [Herb. Philip. Forest. Bur. 26939] (Ca—205427); Ramos & Edaño s.n. [Herb. Philip. Bur. Sci. 49518] (Ca—323889); Wenzel 2759 (Ca—317036). Negros: Perlas s.n. [Herb. Philip. Forest. Bur. 30675] (Ca—358560); A. Reyes s.n. [Herb. Philip. Forest. Bur. 29932] (Ca—268041). MARIANNA ISLANDS:

Guam: R. V. Moran 4597 (Ca--52220). MOLUCCA ISLANDS: Buru: Saprin [Toxopeus] 52 (Ca--234921). HAWAIIAN ISLANDS: Oahu: R. Cowan s.n. [Sept. 7, 1944] (Du--377961); Degener & Park 9509 (Mi). CULTIVATED: Florida: R. F. Thorne 10062 (Ca--965097). Hawaiian Islands: A. F. Judd s.n. [Bishop Estate Nursery, Dec. 1, 1930] (Ca--502394).

VITEX PARVIFLORA f. STERILIS H. J. Lam

Additional literature: Moldenke, Phytologia 6: 42--44. 1957; Moldenke, Résumé 185, 226, 423, & 477. 1959.

Recent collectors describe this plant as a tree 10 m. tall, the trunk 40 cm. in diameter at breast height, the wood strong, making good timber, considered the best wood for posts in Luzon, and used in house construction. The flowers are white to bluish, slightly odorous, and the fruit is fleshy, black when ripe. Both flowers and fruit, according to Cordero, smell like "brea". Clemens reports it as the host of a parasitic fungus on the leaves. A vernacular name is "molave". It has been collected at an altitude of 110 meters, in fruit in October. Herbarium material has been distributed under the name V. parviflora Decne.

Additional citations: PHILIPPINE ISLANDS: Leyte: F. Franco s. n. [Herb. Philip. Forest. Bur. 26408] (Ca--239317). Luzon: H. H. Bartlett 14940 (Ca--164199); M. S. Clemens 4870 (Ca--268139); Miras s.n. [Herb. Philip. Forest. Bur. 25697] (Ca--239368); Parros & Nera 4 [Herb. Philip. Forest Bur. 30143] (Ca--291921); I. Pascual s.n. [Herb. Philip. Forest. Bur. 23063] (Ca--205891); Quisumbing s.n. [Philip. Nat. Herb. 6579] (Ca--985442). Mindanao: Cordero 1 [Herb. Philip. Forest. Bur. 29816] (Ca--256837). CULTIVATED: Philippine Islands: Sulit 13 (Ok--17189, Ok--17233).

VITEX PATULA E. A. Bruce

Additional literature: Moldenke, Phytologia 6: 44--45. 1957; Moldenke, Résumé 151, 154, & 477. 1959.

The Rodin 4232 distributed as this species is V. harveyana H. H. W. Pearson instead.

VITEX PAYOS (Lour.) Merr.

Additional literature: Moldenke, Phytologia 6: 45--47. 1957; Moldenke, Résumé 143, 145, 148--151, 226, 233, 301, 380, 382--385, 389, 416, & 477. 1959; Moldenke, Résumé Suppl. 1: 10. 1959.

Peter describes the flowers of this plant as blue and white, bluish-white, dark-purple, or pale-pink, and found them in anthesis in January, March, April, November, and December. It has been encountered at altitudes of 150 to 1300 meters. Herbarium material has been misidentified and distributed as V. hildebrandtii var. glabrescens Pieper.

Additional citations: TANGANYIKA: H. G. Faulkner 1331 (B, S); A. Peter 14531 [O.III.219] (B), 16210 [O.IV.35] (B), 24179 [O.IV.319] (B), 33047 [V.90] (B), 33141 [V.93] (B), 33896 [V.111] (B),

40654 [V.244] (B), 46477 [V.208] (B). SOUTHERN RHODESIA: Eyles 4387 (Mg--172); A. Peter 51119 [S.64] (B). PORTUGUESE EAST AFRICA: Mozambique: A. Peter 51168 [S.66] (B). MOUNTED ILLUSTRATIONS: Photograph of type and original description (N).

VITEX PAYOS var. GLABRESCENS (Pieper) Moldenke

Additional literature: Moldenke, Phytologia 6: 47--48. 1957; Moldenke, Résumé 143, 145, 149--152, 384, & 477. 1959.

Peter describes this plant as a tree, growing at an altitude of 280 meters. Herbarium material has been misidentified and distributed as V. volkensii Gürke.

Additional citations: MALI: Soudan: Jaeger 3769 (Z). TANGANYIKA: A. Peter 20936 [O.IV.196] (B).

VITEX PAYOS var. STIPITATA Moldenke, var. nov.

Haec varietas a forma typica speciei foliolis perspicue stipitatis recedit.

This variety differs from the typical form of the species in having its leaflets plainly petiolulate, the petiolules being 5--10 mm. long.

The type of the variety was collected by Ernest Henry Wilson (no. 194) in thickets around Kampala, Uganda, on December 22, 1921, and is deposited in the herbarium of the University of California at Berkeley.

Citations: UGANDA: E. H. Wilson 194 (Ca--381408--type).

VITEX PEDUNCULARIS Wall.

Additional literature: Moldenke, Phytologia 6: 49--51. 1957; Moldenke, Résumé 159, 165, 166, 177, 178, 226, 380, 386--388, & 477. 1959.

Recent collectors describe the bark of this tree as blackish, the trunk to 1.1 meters in circumference, and the fruit globose, slightly bitter. They have found it in mixed deciduous forests with Quercus, in dry deciduous forests, in dry dipterocarp forests, "occasional" in open Quercus-dipterocarp forests, and "common" in mixed deciduous forests, ascending to 850 meters altitude, flowering also in February, and fruiting also in April and July. Khant reports that its wood is used for building and other purposes. It is possible, in my estimation, that V. ajugaeflora Dop is conspecific with V. peduncularis.

Additional citations: BURMA: Upper Burma: Ihan 35 (Ut--44167a); Khant 141 (N). INDOCHINA: Annam: Poilane 1336 (B, Ca--53762), 2856 (B). Cambodia: Poilane 14937 (B), 17320 (B); Thorel 1006 (B). Cochinchina: Poilane 17320 (Ca--38874); Thorel 1006 (Ca--38106). THAILAND: Bunchuai 181 [Herb. Roy. Forest Dept. 22656] (Gg); Sørensen, Larsen, & Hansen 956 (Bm), 2598 (Bm), 2642 (Bm), 3900 (Bm).

VITEX PETERSIANA Klotzsch

Additional literature: Moldenke, Phytologia 6: 56--57. 1957; Cavaco, Mem. Soc. Broter. 13: 74. 1958; Moldenke, Résumé 148, 151, 384, & 477. 1959.

VITEX PIERREANA Dop

Additional literature: Moldenke, Phytologia 6: 59--60. 1957; Moldenke, Résumé 174, 177, 388, 419, 420, & 477. 1959.

Pierre reports that the trunk of this tree is to 18 m. tall and 30--68 cm. in diameter.

Additional citations: INDOCHINA: Cochinchina: Pierre s.n. [ad flumen Saigon, 3/5/1866] (B, B, Ca--54810).

VITEX PIERREI Craib

Additional literature: Moldenke, Phytologia 6: 60--61. 1957; Moldenke, Résumé 177, 178, 419, & 477. 1959.

Recent collectors describe this as a tree 8 m. tall, with a crooked and twisted stem, gray bark, and yellow or dirty-yellow flowers, blooming in March and April, growing scattered in mixed deciduous forests at an altitude of 300 m. The vernacular name "sakhang ton" is recorded.

Pierre 5218 is marked "sp. nov." on the labels, but apparently is not one of the cotype collections.

Additional citations: INDOCHINA: Annam: Evrard 1512 (B). Cochinchina: Evrard 2766 (Ca--54811); Pierre 5218 (B, Ca--38879, Ca--54956). THAILAND: Smitinand 2551 (Z); Suvarnakoses 1430 [Roy. Forest Dept. 16559] (Z).

VITEX PINNATA L.

Additional literature: S. Moore in Rendle, Journ. Bot. Lond. 63: Suppl. 81. 1925; Neal, In Gard. Hawaii 643. 1948; Moldenke, Phytologia 6: 61--64 & 70--79. 1957; Moldenke, Résumé 76, 157, 159, 165--167, 177, 178, 181, 185, 187--189, 191--196, 198, 226, 234, 302, 335, 381, 382, 384--386, 388, 393, 419, 427, & 477. 1959; Moldenke, Résumé Suppl. 1: 12. 1959.

Additional synonymy: Vitex pubescens var. genuina Hochr., Plant. Hochr. 3: 17. 1934.

Recent collectors describe this as a large tree, with a trunk 100--120 cm. in circumference, the lower 5 m. without any branches, the leaflets much paler green beneath, the panicles erect or nearly so, yellowish-brown throughout except for the open corollas blue, light-blue, pale-blue, lilac, "purple and white", or even yellow; fruit dark-purple, purplish-black, or black when mature. The flowers are sometimes described as pale-violet or bluish-purple, and the young fruit as globose, green, topped with brown.

The species has been found in secondgrowth forests, at the edges of forests, in open land, in forests along the upper reaches of sea-water, on plains, and near beaches. Elmer says that it is "a small-sized tree everywhere in the woods" in British North Borneo, while Henderson describes it as a "small tree common on the seashore" in Pahang. It has been found in anthesis also in

November, and in fruit in July and November. In Thailand it is said to be common in evergreen forests and in mixed deciduous forests by streams. Additional vernacylar names are "aloban-bótu", "amuraon", "binh linh", "culimpapa", "kara", "ketileng", "kulipapa", and "Malayan teak".

Hochreutiner describes his V. pubescens var. genuina as follows: "Flores striato-coeruleo-violacei; folia trifoliata inflorescentia plusminus corymbosa, i.e. minus thyrsoidea quam in var. sequent., calyx fere truncatus." His type is Hochreutiner 2301, collected in "brousse avec restes de forêt, pentes vers la mer, alt. ca. 60 m., 20 octobre 1904."

Additional citations: INDIA: United Provinces: Khant 132 (N). West Bengal: Helfer 132 (B). INDOCHINA: Annam: Pierre 2224 [Lign. coll. 187] (B, B); Poilane 6259 (Ca--38173). Cambodia: Chatillon s.n. [Prey Kedey, 19-4-1907] (Ca--53757); Poilane 13892 (B).Cochinchina: Germain s.n. (B); Pierre 2224 (Ca--53981, Ca--54797); Poilane 40852 (Ca--54816); Bordeneux s.n. [Bencat, aout 1905] (Ca--38886); Thorel 1004 (B, Ca--53754). Laos: Poilane 11399 (B), 16103 (B). Pulau Condor: Perry s.n. [7/1870] (Ca--54813). Tonkin: Pierre s.n. (B, B). State undetermined: Collector undesignated 44 (B). THAILAND: Bunpheng 982 [Roy. Forest Dept. 16064] (Sm); Kerr 10885 (B), 11132 (B); Put 894 (B); Rabil 243 (B); Smitinand 2968 [Roy. Forest Dept. 12670] (Sm); Winit Wanandorn 249 [Herb. Roy. Forest Dept. 1994] (Vi). MALAYA: Pahang: M. R. Henderson 10750 (Ca--360665), 18466 (Ca--318553). Penang: Haniff 124 (Ca--355297). Selangor: Burkill & Shah 947 (Ng--20206). Singapore: H. N. Ridley s.n. [Bukit Tunah, 1900] (Ca--267600). PHILIPPINE ISLANDS: Palawan: Cenabre s.n. [Herb. Philip. Forest. Bur. 29995] (Ca--291794); Cenabre, Gellidon, & Paras s.n. [Herb. Philip. Forest. Bur. 27872] (Ca--213949); Edaño s.n. [Philip. Nat. Herb. 13999] (Mg); R. C. McGregor s.n. [Herb. Philip. Bur. Sci. 45964] (Ca--309255). Sulu: Ramos & Edaño s.n. [Herb. Philip. Bur. Sci. 44138] (Ca--257651). Palawan: R. B. Fox s.n. [Philip. Nat. Herb. 13428] (Mi). SUMATRA: Bartlett & La Rue 351 (Ca--243872); Krukoff 314 (N); Toroes 364 (Ca--91889); Yates 611 (Ca--232531), 663 (Ca-232451), 1267 (Ca--251149). KARIMANDJAWA ISLANDS: Karimandjawa: Karta 311 (B). JAVA: Boerlage 464a (Ca--918503); Koorders 9741b (Ca--265945), 13595b (Ca--265960), 15661b (Ca--234899); Saimoendt 38 (Ca--307850). KAMBANGAN ISLAND: Hochreutiner 2301 (Ca--41278). BANGUEY ISLAND: Castro & Melegrito 1511 (Ca--241389). JAMBONGAN ISLAND: Cabiling 3801 [P.T.O. 515] (Ca--347069). BRITISH NORTH BORNEO: Elmer 20101 (Ca--228922, Um--169), 21095 (Ca--312133); Ginang 163 [71; D. D. Wood 2527] (Ca--320254); Goklin 4 [D. D. Wood 1868] (Ca--244262); Orolfo s.n. [D. D. Wood 1896] (Ca--

249064); Puosa s.n. [D. D. Wood 2289] (Ca--286724); Sales 3906 [field no. 468] (Ca--347177). LESSER SUNDA ISLANDS: Timor: Bloembergen 19 [Boschproefst. BB.27071] (Vi). CULTIVATED: Hawaiian Islands: H. N. Moldenke 21851 (Z). Java: Herb. Hort. Bot. Bogor. s. n. (B).

VITEX PINNATA var. ALATA Moldenke

Additional literature: Moldenke, Phytologia 6: 79. 1957; Moldenke, Résumé 177, 191, 423, & 478. 1959.

This plant has been collected in fruit in June and September, and has been identified in herbaria as V. pubescens var. ptilota Dop (which actually may prove to be the same taxon).

Additional citations: INDOCHINA: Annam: Poilane 21 (B), 4685 (B). State undetermined: Evrard 2525 [Cây Binh Linh, descente de Cana] (Ca--53767).

VITEX POLYGAMA Cham.

Additional literature: Moldenke, Phytologia 6: 80--86. 1957; Moldenke, Résumé 111, 226, 250, 301, 383, 385, 388, 389, & 478. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 151. 1960; Angely, Fl. Paran. 16: 80 (1960) and 17: 47. 1961.

The Brade collection cited below has the leaflets sessile. Reitz & Klein collected the species at 10 meters altitude.

Additional citations: BRAZIL: Rio de Janeiro: Brade 14158 [Herb. Rio de Jan. 29520] (B). Santa Catarina: Reitz & Klein 4210 [Herb. Barb. Rodr. 16275] (N, S, Sm). State undetermined: Sellow s.n. [Macbride photos 17565, in part] (N--photo of cotype).

VITEX POLYGAMA var. BAKERI Moldenke

Additional literature: Moldenke, Phytologia 6: 86--87. 1957; Moldenke, Résumé 111, 226, & 478. 1959.

Hatschbach & Lange state that the flowers of this plant are blue. They found the tree in anthesis in December.

Additional citations: BRAZIL: Paraná: Hatschbach & Lange 5319 (Z). CULTIVATED: Brazil: Bot. Gard. Goeldi tree 582 (Bm).

VITEX POLYGAMA var. DUSENII Moldenke

Additional synonymy: Vitex laciniosa Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 225. 1863. Vitex laciniata Turcz. ex Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39 & 103, sphalm. 1942 [not V. laciniata Hort., 1940, nor Host., 1947].

Additional literature: Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 225. 1863; Moldenke, Alph. List Invalid Names 53. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 103, & 104. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 29. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 95, 201, & 202. 1949; Moldenke, Phytologia 5: 429--430 (1956) and 6: 87--88. 1957; Moldenke, Résumé 111, 385, 387, & 478. 1959; Moldenke, Résumé Suppl. 1: 7 & 23. 1959; Rennó, Levant. Herb. Inst. Agron.

Minas 151. 1960; Angely, Fl. Paran. 16: 80 (1960) and 17: 47. 1961.

Additional citations: BRAZIL: Bahia: Kegel 12319 (Z--photo, Z-photo).

VITEX POLYGAMA var. HIRSUTA Schau.

Additional literature: Moldenke, Phytologia 6: 88--89. 1957; Moldenke, Résumé 111 & 478. 1959.

Additional citations: BRAZIL: Espirito Santo: Sellow s.n. [Macbride photos 17565, in part] (N--photo of cotype).

VITEX POOARA Corbishley

Additional literature: Moldenke, Phytologia 6: 89--90. 1957; Moldenke, Résumé 149, 154, 388, & 478. 1959.

Theron describes this as a large tree with pitch-black stone-fruits smelling of bedbugs. He found it fruiting in December, and records the vernacular name "mphoer".

Additional citations: UNION OF SOUTH AFRICA: Transvaal: Theron 2049 (S).

VITEX PYRAMIDATA B. L. Robinson

Additional literature: Moldenke, Phytologia 6: 94--97. 1957; Moldenke, Résumé 40, 387, 388, 390, & 478. 1959; F. Miranda, Bol. Soc. Bot. Mex. 26: 142, 144, & 148. 1961.

McVaugh reports that this tree grows in ravines in Michoacán, but is "not much seen". He found a 10-meter-tall tree with a trunk diameter of 30 cm. at breast height. It has been found in in fruit in November, at altitudes of 66 meters. Miranda explains that the name "yashcabté" means literally "green-branched-tree".

Additional citations: MEXICO: Guerrero: Hinton 9990 (Ca--939136), 10005 (Ur). Jalisco: Herb. Univ. Kans. Mexico Exped. E. 57 (Mi). Michoacán: Hinton 16235 (N); Leavenworth & Hoogstraal 1707 (Mi); McVaugh 18020 (Mi). Sinaloa: H. S. Gentry 5073 (Ca--651836, Mi).

VITEX QUINATA (Lour.) F. N. Will.

Additional literature: Neal, In Gard. Hawaii 643. 1948; Moldenke, Phytologia 6: 98--103. 1957; Moldenke, Résumé 165, 166, 171, 172, 174, 177, 178, 181, 185, 188, 191, 192, 194, 195, 198, 200, 226, 276, 381, 384--386, 388--390,& 478. 1959.

Recent collectors describe the bark as dark-gray, the leaves light shiny-green, the flowers pink, lavender-tinged, "white and drab", or "green and drab", the immature fruit pale-green, and the mature fruit blue-black or purple. It has been encountered in ravines, forests, and along roadsides, flowering in April. Clemens calls it a "shrubby tree on hot partly cleared hill" in Annam. Additional common names are "orange-barked vitex" and "po king".

Additional citations: CHINA: Chekiang: Ching 1987 (Ca--281876); Ling 1074 [Herb. Univ. Nanking 7311] (Ca--252262). Fukien: H. H. Chung 3003 (Ca--243648). Kiangsi: Hu s.n. [1920] (Ca--232221).

Kwangsi: R. C. Ching 7309 (Ca--410038). Kwangtung: W. T. Tsang 21194 (Ca--11206), 21477 (Ca--11589); Ying 770 (Ca--358200), 1066 (Ca--359931). AMOY ISLAND: H. H. Chung 793 (Ca--420312). HONAM ISLAND: E. D. Merrill 9996 (Ca--992450); Ping 1849 [Herb. Canton Chr. Coll. 13674] (Ca--287460). HONGKONG: Taam 1532 (Ca--82712). HAINAN ISLAND: W. Y. Chun 2118 [Herb. Univ. Nanking 7096] (Ca--243589); Chun & Tso 44673 (B); Fung 20420 (B, Ca--11390); F. C. How 70858 (Ca--594824), 71073 (B); How & Chun 70248 (B); Lau 16 (B, Ca--525364), 153 (B, Ca--525244); Lei 66 (B, Ca--611509), 714 (B); Tak 178 [Herb. Lingnan Univ. 15677] (Ca--326084), 223 [Herb. Lingnan Univ. 15722] (Ca--326086), 719 [Herb. Lingnan Univ. 17468] (Ca--356748), 868 [Herb. Lingnan Univ. 16367] (Ca--326085); Tsang 786 [Herb. Lingnan Univ. 18320] (B). INDOCHINA: Annam: Clemens & Clemens 3480 (Ca--340209). Laos: Poilane 15435 (Ca--54808). Tonkin: Balansa 4885 (Ca--53755, Ca--54807, Ca--54812). State undetermined: Collector undetermined 1081 [Phu Ho] (Ca--227709); Petelot 963 (Ca--223917). PHILIPPINE ISLANDS: Mindanao: Wenzel 2523 (B, Ca--316884), 2760 (Ca--316628), 2912 (Ca--316955), 3430 (Ca--354967). Samar: Jager 935 (B). CULTIVATED: China: H. H. Chung 2517 (Ca--233121). Hawaiian Islands: Judd s.n. [Bishop Estate Nursery, Dec. 1, 1930] (B).

VITEX QUINATA var. PUBERULA (H. J. Lam) Moldenke

Additional literature: Moldenke, Phytologia 6: 103--107. 1957; Moldenke, Résumé 171, 172, 174, 177, 178, 185, 186, 188, 191, 192, 194, 195, 200, 202, 203, 207, 226, 382, 384, 417, & 478. 1959.

Recent collectors describe this plant as a tree with a bole 12 m. tall and 50 cm. in diameter, with buttresses to 1 m.; bark yellowish-brown, deeply fissured, in strips 2--4 cm. wide and 4 mm. thick, the living bark 5 mm. thick, yellowish; wood soft, white; young parts brown-red; leaves light-green; inflorescence gray; flowers odorless; calyx dull violet-tinged or purple; corolla white, "creamy-white, deep-blue inside", "white and yellow", "dirty-white, the lower lip dark-purple inside", or "dull violet-tinged at the base, otherwise sordid-white with a violet tinge on the inside of the 4 equal petals, the lip violet-blue"; stamens long, white, or the filaments dull violet-tinged and the anthers dark-violet; pollen whitish; style sordid-whitish; unripe fruit gray-green or greenish, dark-brown when ripe.

It has been collected dense jungles and in open forests. On Morotai it is found in stony clay soil of primary forests in flat country. It has been found in anthesis also in April and July, and in fruit in November. Additional common names are "drai tolu" and "shek wong king".

Herbarium material has been misidentified and distributed as V. sumatrana var. urceolata (C. B. Clarke) King & Gamble. Merrill says of Castro & Melegrito 1592 "a form with trifoliolate

leaves, India to Formosa through Malaysia to Celebes" — see his Enum. Philip. Flow. Pl. 3: 396 (1923).

Additional citations: CHINA: Kwangsi: Ching 5552 (Ca--410181). Kwangtung: Peng, Tak, & Kin 614 [Herb. Canton Chr. Coll. 12613] (Ca--274434). FORMOSA: Matuda 901 (Ca--345187). HAINAN ISLAND: Lei 714 (Ca--612495). INDOCHINA: Annam: Poilane 1640 (B), 11074 (B). Tonkin: Balansa 4885 (B); Pételot 977 (Ca--223923); Poilane 13060 (B). THAILAND: Bunchuai 76 (Z). MALAYA: Perak: King's collector 7530 (Ca--529750). JAVA: Backer 17102 (B); Koorders 9828b (Ca--265948), 9833b (Ca--265947), 9844b (Ca--265949); Saimoendt 63 (Ca--307849). BANGUEY ISLAND: Castro & Melegrito 1592 (Ca--241557). BRITISH NORTH BORNEO: M. S. Clemens 10274 (Ca--214817); Sales 3912 (Ca--347168). BORNEO: M. Jacobs 5144 (Ba); Kostermans 6895 (Ng--16874, Ng, Ng). CELEBES: Koorders 19551b (Ca--265951). MOLUCCA ISLANDS: Morotai: Tangkilisan 200 (Ng--16935). Obi: Beth. Forest. Serv. BB.23819 (Mg--56523). NEW GUINEA: Dutch New Guinea: C. Koster B.W.1121 (Ng--16910); Mangold B.W.2082 (Ng--20199), B.W.2106 (Ng--20193); Schram B.W.1848 (Ng--20200), B.W.1869 (Ng--20218), B.W.1907 (Ng--20198), B.W.1965 (Ng--20196, Ng). FIJI ISLANDS: Viti Levu: O. Degener 14481 (Ca--16151); J. W. Gillespie 2953 (B, Ca--447952), 4164.1 (B, Ca--448713); Greenwood 344a (Ca-2117); A. C. Smith 4307 (S), 6295 (S). CULTIVATED: Java: Herb. Hort. Bot. Bogor. s.n. (B).

VITEX RADULA Mildbr.

Additional literature: Moldenke, Phytologia 6: 108. 1957; Moldenke, Résumé 145, 150, & 478. 1959.

Additional citations: BRITISH NYASALAND: Stolz 1398 (B--cotype).

VITEX RAPINI Beauvis.

Additional synonymy: Vitex rapinii Beauvis. ex Moldenke, Résumé 388, in syn. 1959.

Additional literature: Guillaumin, Ann. Mus. Colon. Marseilles 9: 205. 1911; Moldenke, Phytologia 6: 108--109. 1957; Moldenke, Résumé 206, 342, 388, & 478. 1959.

Additional citations: NEW CALEDONIA: Pancher s.n. (B).

VITEX RAPINIOIDES Guillaum.

Additional literature: Moldenke, Phytologia 6: 109--110. 1957; Moldenke, Résumé 205, 388, & 478. 1959.

Additional citations: NEW HEBRIDES: Efate: Kajewski 211 (N). Eromanga: Kajewski 299 (N).

VITEX REHMANNI Gürke

Additional literature: Moldenke, Phytologia 6: 112--113. 1957; Biol. Abstr. 29: 3602. 1957; Moldenke, Résumé 154, 388, & 478. 1959.

The species has also been collected in anthesis in January and in fruit in June.

Additional citations: UNION OF SOUTH AFRICA: Transvaal: Sidey 2477 (S); Smuts & Pole-Evans 860 (S); L. E. Taylor 482 (Ca--956045).

VITEX REHMANNI f. SUBTOMENTOSA Moldenke

Additional literature: Moldenke, Biol. Abstr. 29: 3602. 1957; Moldenke, Phytologia 6: 113--114. 1957; Moldenke, Résumé 154, 388, & 478. 1959.

VITEX RIVULARIS Gürke

Additional literature: Moldenke, Phytologia 6: 114--116. 1957; Moldenke, Résumé 137--139, 143, 382, & 478. 1959.

Additional citations: CAMEROONS: Zenker 2691a (B), s.n. [Bipindi] (Ca--620105).

VITEX RUBRO-AURANTIACA DeWild.

Additional literature: Moldenke, Phytologia 6: 117--118. 1957; Moldenke, Résumé 143 & 478. 1959.

The species has been found at 470 meters altitude, blooming in September.

Additional citations: CONGO: Louis 4294 (Ca--962327), 5786 (Vi, Vi), 5900 (Ca--962275).

VITEX RUFA A. Chev.

Additional literature: Biol. Abstr. 30: 1703. 1956; Assoc. Etud. Fl. Afr. Trop. Ind. 1955: 63. 1956; Moldenke, Phytologia 6: 118--119. 1957; A. Fernandes, Mem. Soc. Broter. 13: 34. 1958; Biol. Abstr. 30: 4370. 1958; Moldenke, Résumé 137 & 478. 1959.

Apparently, the Cavaco, Bull. Mus. Nat. Hist. Nat. Paris, sér. 2, 27: 91 reference cited by me in Phytologia 6: 118 (1957) as "1956" should be dated "1955."

VITEX SAMPSONI Hance

Additional literature: Moldenke, Phytologia 6: 121. 1957; Moldenke, Résumé 171 & 478. 1959.

Additional items of description: bracts and bractlets linear, 3-5 mm. long; calyx 3--4 mm. long, glabrous, its tube about 2 mm. long, the lobes equal, lanceolate, equaling the tube, acuminate at the apex; corolla about 9 mm. long, the tube about 5 mm. long, the lower 2 mm. cylindric, then widened, pubescent on the outside, bearded inside at the insertion of the stamens, the lobes pubescent on the exterior, the middle lobe of the large lip 3.5--4 mm. long, about 3 mm. wide, undulate, pubescent on the exterior, the median part pubescent inside, the margins more or less crisped-inflexed, the lateral lobes elliptic, about 2 mm. long and 1.5 mm. wide, slightly cucullate, glabrous inside, the small lip reflexed, cleft, the 2 lobes broadly ovate, about 1.5 mm. long; filaments glabrous, about 6 mm. long; style equaling the filaments, glabrous; fruit globose, about 3.5 mm. wide, glabrous; pyrenes 4.

The species has been found flowering and fruiting in July.

Additional citations: CHINA: Kwangtung: Ying 782 (Ca—358297).

VITEX SCHLIEBENI Moldenke

Literature: Moldenke, Phytologia 7: 85—86. 1959; Assoc. Etud. Tax. Fl. Afr. Trop. 1959: 53. 1960.

Synonymy: Vitex schliebenii Moldenke ex Assoc. Etud. Tax. Fl. Afr. Trop. Index 1959: 53. 1960.

See the first reference cited above for complete description of this species.

Citations: TANGANYIKA: Schlieben 6008 (B—type, Z—isotype).

VITEX SCHOMBURGKIANA Schau.

Additional literature: Moldenke, Phytologia 6: 125—126. 1957; Moldenke, Résumé 76, 112, 323, 382, & 478. 1959.

Irwin describes this as a low tree, and found it on a savanna at the edge of a rainforest, growing in fine brown sand. Herbarium material has been misidentified and distributed as V. capitata Vahl.

Additional citations: BRITISH GUIANA: Irwin 889 (Au—165609).

VITEX SECUNDIFLORA H. Hallier

Additional literature: Moldenke, Phytologia 6: 128 (1957) and 6: 129. 1958; Moldenke, Résumé 191 & 478. 1959.

The species has been encountered at altitudes of 100 to 300 meters.

Additional citations: BORNEO: Dachlan 37 [Z. O. B. 3513; Boschproefst. BB.10715] (B, Ca—345840).

VITEX SELLOWIANA Cham.

Additional literature: Moldenke, Phytologia 6: 130—132. 1958; Moldenke, Résumé 112, 226, 389, & 478. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 151. 1960.

VITEX SIAMICA F. N. Will.

Additional literature: Moldenke, Phytologia 6: 132—133. 1958; Moldenke, Résumé 178, 181, & 478. 1959.

This species has been found blooming also in November.

Additional citations: MALAYA: Langkawi Islands: Holttum 15095 (Ca—283987). Selangor: Nur 34381 (Ca—3105).

VITEX SIMPLICIFOLIA Oliv.

Additional literature: Moldenke, Phytologia 6: 133—135. 1958; Moldenke, Résumé 133, 134, 137—140, 143, 381, 383, 389, & 478. 1959.

The Latilo & Daramola 34490 distributed as this is cited by me as var. vogelii (J. G. Baker) Pieper.

VITEX SIMPLICIFOLIA var. VOGELII (J. G. Baker) Pieper

Additional literature: Moldenke, Phytologia 6: 135—136. 1958; Moldenke, Résumé 138—140, 391, & 478. 1959.

Recent collectors have found this tree in open savannas, with

very small green fruits in February. Herbarium material has been misidentified and distributed as typical V. simplicifolia Oliv.

Additional citations: MALI: Soudan: P. Jaeger 5778 (Z). CAMEROONS: Latilo & Daramola 34490 (B).

VITEX SPRUCEI Briq.

Additional literature: Moldenke, Phytologia 6: 137—139. 1958; Moldenke, Résumé 112, 387, 389, & 478. 1959.

Collectors describe the flowers of this plant as white and aromatic. It blossoms also in September.

Additional citations: BRAZIL: Amazonas: Coelho s.n. [Herb. Inst. Nac. Pesq. Amaz. 1984] (Z); Ducke s.n. [Herb. Rio de Jan. 22577] (B); Francisco s.n. [Herb. Inst. Nac. Pesq. Amas. 2063] (Bs); Frões 22264 (Ut—95452a); Herb. Inst. Nac. Pesq. Amaz. 1836 (Bs).

VITEX SPRUCEI var. VAUPESENSIS Moldenke

Literature: Moldenke, Phytologia 6: 332. 1958; Moldenke, Résumé 69 & 478. 1959.

This variety differs from the typical form of the species in having its leaflets uniformly 3 in number.

The type of the variety was collected by Bassett Maguire, John J. Wurdack, and W. M. Keith (no. 41839) on a small savanna 0.5—1.5 km. north of Puerto Colombia, on the Río Guainia opposite to Maroa, Vaupés, Colombia, at an elevation of 130 meters, on October 12, 1947, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collectors describe the plant as a tree 3—8 meters tall, the corollas white, the lip with a basal yellow spot, and state that it is frequent in the type locality.

Citations: COLOMBIA: Vaupés: Maguire, Wurdack, & Keith 41839 (N—type, N—isotype, S—isotype, S—isotype).

VITEX STAHELII Moldenke

Additional literature: Moldenke, Phytologia 6: 140—142. 1958; Moldenke, Résumé 69, 74, 76, 77, 389, & 478. 1959.

Additional citations: VENEZUELA: Delta Amacuro: Rusby & Squires 257, in part (Ca—52369).

VITEX STRICKERI Vatke & Hildebr.

Additional synonymy: Vitex parvifolia Peter ex Moldenke, Résumé 387, in syn. 1959. Vitex striekeri Vatke & Hildbr., in herb.

Additional literature: Moldenke, Phytologia 6: 143. 1958; Moldenke, Résumé 145, 146, 387, 389, & 478. 1959.

Recent collectors describe this plant as a liana to 15 meters long, a compact bush, a scrambling shrub 1—3.5 m. tall, or a tree to 8 m. tall, profusely leafy, the whole plant aromatic, the young stems with dense brown indumentum; stems erect, sharply aromatic; sap colorless; tips of twigs with orange pubescence; calyx brownish-green or deep-brown, 5-lobed; corolla small, white or cream-colored to lime-white or pale-pink, slightly aromatic; fil-

anants cream-colored; anthers brown or buff; fruit green with a reddish flush, edible.

The species has been collected in scattered-tree grasslands, at the fringe of evergreen forests, at the margins of thickets in Brachystegia woodlands, on gravel and black cotton soil in thick forests, and on loose brown soil at the edge of thick cover, from sealevel to 1275 meters altitude, blooming in March, April, and July to September, and December, fruiting in April, June, and July. The leaves are cooked and the resulting water is used to rinse the mouth in the treatment of swollen gums. A vernacular name is "mhamu".

Peter 33224 is the type collection of V. parvifolia Peter. Herbarium material has been misidentified and distributed as V. lamiana Pieper, Premna sp., Clerodendron sp., and even Allophylus sp. in the Sapindaceae.

Additional citations: TANGANYIKA: Busse 2163 [A. Peter 51807] (B); Drummond & Hemsley 1810 (S), 3579 (S); H. G. Faulkner 563 [12.iii.1950] (S), 563 [5.iv.1950] (S); Merker 714 (B); A. Peter 14176 [O.I.35] (B), 16335 [O.IV.43] (B), 16684 [O.IV.52] (B), 20672 [O.IV.191] (B), 20884 [O.IV.195] (B), 24845 [O.IV.340] (B), 33224 [V.94] (B), 39460 [V.203] (B), 42239 [V.282] (B, Z); Schlieben 5623 (B); Tanner 630 (Ca--178110), 2065 (Ca--170465). KENYA: Bogdan B.57 (Ca--943546).

VITEX SUMATRANA Miq.

Additional literature: S. Moore in Rendle, Journ. Bot. Lond. 63: Suppl. 81. 1925; Moldenke, Phytologia 6: 144--145. 1958; Lam & Bakh., Bull. Jard. Bot. Buitenz., sér. 3, 3: 54--55. 1921; Moldenke, Résumé 166, 188, 191, 389, & 478. 1959.

VITEX SWYNNERTONII S. Moore

Additional literature: Cavaco, Mem. Soc. Broter. 13: 74. 1958; Moldenke, Phytologia 6: 145--146. 1958; Moldenke, Résumé 151 & 478. 1959.

VITEX TANGENSIS Gürke

Additional literature: Moldenke, Phytologia 6: 146--147. 1958; Moldenke, Résumé 145, 146, 151, 388, & 478. 1959.

Peter describes this plant as a shrub, 3 m. tall, with pink flowers, blooming in April.

Additional citations: TANGANYIKA: A. Peter 39696 [V.211] (B, Z).

VITEX THYRSIFLORA J. G. Baker

Additional literature: Moldenke, Phytologia 6: 152--153. 1958; Moldenke, Résumé 136--139, 143, 151, 380, 387, 389, & 478. 1959.

Additional citations: IVORY COAST: Aubréville 154 (B). CAMEROONS: Zenker & Staudt 355 (B).

VITEX TOMENTULOSA Moldenke

Additional literature: Moldenke, Phytologia 6: 154—155. 1958; Moldenke, Résumé 53 & 478. 1959.

Alain describes this as a shrub, 2 m. tall, inhabiting the coastal thickets.

Additional citations: CUBA: Pinar del Río: Alain 6915 (Bm).

VITEX TRIFLORA Vahl

Additional literature: Moldenke, Phytologia 6: 156—161. 1958; Moldenke, Résumé 74, 76—78, 85, 112, 115, 226, 248, 274, 319, 341, 381, 383, 387, 389, 390, 415—417, & 478. 1959.

Asplund describes this plant as a tree 20 m. tall, with the corollas pale-lilac, their lobes light-blue.

Additional citations: BRITISH GUIANA: Little 16618 (Bm). SURINAM: B. Maguire 24837 (Ur). PERU: Huánuco: Asplund 12729 (S). BRAZIL: Amazonas: Chagas s.n. [Herb. Inst. Nac. Pesq. Amaz. 3970] (Bs); Luis s.n. [Herb. Inst. Nac. Pesq. Amaz. 1165] (Bs).

VITEX TRIFLORA var. KRAATZII Huber

Additional literature: Moldenke, Phytologia 6: 163—164. 1958; Moldenke, Résumé 112, 383, & 478. 1959.

Additional citations: BRAZIL: Pará: N. T. da Silva 2 (Ca—72972).

VITEX TRIFLORA var. QUINQUEFOLIOLATA Moldenke

Additional literature: Moldenke, Phytologia 6: 164—165. 1958; Moldenke, Résumé 85, 112, 390, & 478. 1959.

Additional citations: BRAZIL: Acre Territory: Krukoff 5765 (Mi—isotype).

VITEX TRIFOLIA L.

Additional synonymy: Vitex trifolia var. trifoliolata H. J. Lam, in herb.

Additional and emended literature: Drake del Castillo, Fl. Polynés. Franç. 151. 1893; Valet., Bull. Dept. Agric. Ind. Néerl. 10: 51. 1907; Guillaumin, Ann. Mus. Colon. Marseille 9: 66 & 206. 1911; F. M. Bailey, Compreh. Cat. Queensl. Pl. 386. 1913; Neal, In Gard. Hawaii 641. 1948; E. H. Walker, Proc. 8th Pacif. Sci. Cong. 4: 402. 1957; Menninger, 1958 Price List [7]. 1958; Menninger, 1959 Price List [6]. 1958; Moldenke, Phytologia 6: 165—174. 1958; Moldenke, Résumé 154, 157—159, 165—167, 171, 173, 175, 178, 181, 182, 185, 186, 188, 189, 191, 193—196, 198, 200, 202—207, 211, 212, 226, 249, 250, 302, 335, 379, 380, 384, 385, 389—391, 423, 427, & 478. 1959; Moldenke, Résumé Suppl. 1: 10 & 12. 1959; Hara, Outline Phytogeog. Japan 84. 1959; Menninger, 1960 Price List Flow. Trees [10]. 1960.

Recent collectors call this a strand bush, large shrub, or small tree, with lilac corollas, fruiting in January, inhabiting grasslands and open places in Sumatra.

A photograph accompanies the Yates 1941 specimen in the University of California herbarium. Hara, in the reference cited

above, records V. trifolia from the island of Amani-oshima in the Liukiu Islands. I have not seen the material on which he bases this record, but suspect that it will prove to be var. bicolor (Willd.) Moldenke. The Boesa 551, Brass 25548, Blackburn s.n., Bangham & Bangham 615 & 806, Chapin 853, O. Degener 9505, Franc 1024, Kuntze 4448 & 5817, Herb. Mus. Yale School Forest. 22664 A. C. Smith 4559, 6078, & 6610, F. K. Ward 8929, and Waterhouse 60, all previously distributed and even in some cases cited by me as V. trifolia, are var. subtrisecta (Kuntze) Moldenke, as is also Herb. Mus. Paris s.n. [Timor], distributed as V. trifoliata Lam. The Menninger s.n. [Stuart, April 17, 1945] cited by me in Phytologia 6: 174 (1958) as V. trifolia is actually var. subtrisecta, as are probably the plants referred to by Menninger in the several works by him listed in the above bibliography. The V. trifolia of Neal, In Gard. Hawaii 641, called by her "blue vitex", is var. subtrisecta, as examination of herbarium specimens in the herbarium of the Bishop Museum, Honolulu, has shown. The Kanehira 2273 distributed as V. trifolia is actually var. bicolor, while Kajewski 84 is var. variegata Moldenke.

Drake del Castillo records V. trifolia from Noukahiva, Marquesas Islands, on the basis of a "Le Bastard" collection not seen by me. He says for its geographic distribution "Regions chaudes del'Ancien Monde". Guillaumin cites a Pennel 300 also not yet seen by me.

Additional citations: MADAGASCAR: Viguier & Humbert 439 bis (B). SEYCHELLES ISLANDS: Mahé: Deschamps s.n. [22 fév. 1892] (B). INDOCHINA: Cochinchina: Thorel 2092 (B). PHILIPPINE ISLANDS: Mindoro: Conklin s.n. [Mt. Yagew, May 4, 1953] (Mi). SUMATRA: Dorsett & Fairchild 499 (Ca--291411); Yates 524 (Ca--234112), 1480 (Ca--263981), 1941 (Ca--287207). JAVA: Koorders 28038b (Ca--265959). CELEBES: Bünnemeijer 10633 (Ca--234985). NEW HEBRIDES: Tanna: Kajewski 66 (N). NEW CALEDONIA: Franc 56, in part (Ca--390572, N), 1201 (Ca--390603). TONGAN ISLANDS: Eua: H. E. Parks 16178 (N). FIJI ISLANDS: Ovalau: J. W. Gillespie 4503 (N). SAMOAN ISLANDS: Tutuila: Garber 611 (N). AUSTRALIA: New South Wales: Boorman s.n. [Tweed Heads, 1-1914] (Ca--182684). CULTIVATED: Indochina: Pierre 389 (B).

VITEX TRIFOLIA var. BICOLOR (Willd.) Moldenke

Additional literature: Guillaumin, Ann. Mus. Colon. Marseille 9: 66. 1911; Moldenke, Phytologia 6: 174--180. 1958; Moldenke, Am. Midl. Nat. 59: 366. 1958; Yuncker, Bishop Mus. Bull. 220: 232. 1959; Moldenke, Résumé 155, 157, 165, 167, 175, 181, 182, 185, 186, 189, 191, 194--196, 198, 200, 202--207, 211, 212, 226, 380, 381, 384, 387--389, 427, & 478. 1959.

Recent collectors describe this as a bush or a small to med-

ium-sized, slender, much-branched tree, the bole to 1.5 m. tall and to 20 cm. in diameter at breast height; bark smooth, cinereaceous-brown; sapwood thin, brown; heartwood yellow-brown; leaves green or pale gray-green above, varying from gray, grayish-green, glaucous-gray, or white beneath, those close to the inflorescence 3-foliolate, those lower down 5-foliolate; corolla light-blue, pale lilac-blue, violet, purple, "blue and white", "deep-blue, paler outside", or even "whitish when fresh" [Evangelista 362]; young fruit light-green, globose.

It has been found by collectors on shores, seashores, dry shore lines, seacoasts, along the strand, in forests and secondary forests, along streams, in seashore thickets, and along streams in lowlands near the sea. On Papua it is said to be "frequent in the littoral strip" and "common on narrow sand beaches on inner side of mangroves"; on Hayman Island it is "common on beach at edge of light rainforest"; and in the Pelew Islands "very common on the seashore". It has been collected in flower and fruit in July.

In Samoa the juice is extracted and used in the treatment of fevers. Guerrero reports that in the Philippines the leaves are cooked and the juice then used for bathing patients that have been attacked by malarial fever for a long period of time. In Fiji the leaves are mashed, coconut oil is added, the mixture placed in a good banana leaf and heated -- broken bones are then rubbed hard with this concoction and tied tight.

The Franc 56 cited below from the University of California herbarium is definitely this variety even though other specimens of the same number are cited by me as the typical form of the species. Guillaumin cites a Pennel 300 not yet seen by me.

Additional common names are "drala", "dralakaka", "gregit", "lagundi", "lala tahi", "mulokaka", and "namurlega".

Additional citations: INDOCHINA: Cochinchina: Godefroy s.n. [Ba yoc] (Ca--53719). PHILIPPINE ISLANDS: Mindanao: Ahern 671 (Ca--260119); Guerrero 25 [Herb. Philip. Forest. Bur. 30388] (Ca-321155); Florita 20 [Herb. Philip. Forest. Bur. 29757] (Ca--257032). Panay: G. Edaño s.n. [Herb. Philip. Bur. Sci. 46232] (Ca--309671). MARIANNA ISLANDS: Tinian: R. S. Cowan s.n. [April 3, 1945] (Ca--995191); Kanehira 2273 (N). CAROLINE ISLANDS: Uman: Takamatsu 328 (Ca--805551). KARIMANDJAWA ISLANDS: Karimandjawa: Karta 412 (B). JAVA: Bakhuizen van den Brink 6580 (Ca--301376). BANGUEY ISLAND: Castro & Melegrito 1636 [Melegrito 130] (Ca--241652). BRITISH NORTH BORNEO: Apostol 29 [D. D. Wood 1820] (Ca--244323); Evangelista 362 [D. D. Wood 2589] (Ca--320376); Ginsrg 193 [D. D. Wood 2502] (Ca--320280). CAROLINE ISLANDS: Arekalong: Takamatsu 1697 (Ca--805550). MOLUCCA ISLANDS: Ceram: Kornassi 926 Rutten 111 (Ca--265946). NEW GUINEA: Dutch New Guinea: Royen 3115 (Ng--16942). Papua: Brass 21928 (Ng--170911), 25548 (S), 28095 (S); Womersley & Gray 8617 (Ng--16844, Ng--16844). SOLOMON ISLANDS:

Guadalcanal: J. C. Riley 52 (Ca--744903). NEW CALEDONIA: Franc 56, in part (Ca--390609); C. Skottsberg 9 (Go). TONGAN ISLANDS: Tongatapu: Setchell & Parks 15298 (Ca--403218), 15551 (Ca--297563), 15578 (Ca--297638). FIJI ISLANDS: Ovalau: J. W. Gillespie 4503 (Ca--448981, B). Ththia: E. H. Bryan 556 (Ca--805552). Kandavu: A. C. Smith 314 (Ca--601858). Vanua Levu: Degener & Ordonez 14058 (N); A. C. Smith 6622 (S). Viti Levu: O. Degener 13691 (N), 15044 (N); Ordonez s.n. [O. Degener 13620] (N); H. E. Parks 20857 (Ca--447555). SAMOAN ISLANDS: Safotu: Vaupel 389 (Ca--882869). Savaii: Christophersen 2849 [J. Bower s.n.] (Ca--592222). Tau: D. W. Garber 611 (B). Tutuila: Sttupe 531 (Ca--216023). Upolu: A. J. Eames 36 (B, Ca--592436). NIUE ISLAND: Yuncker 10041 (Ca--882868). AUSTRALIA: Queensland: F. Mueller s.n. [Endeavour River] (Mn--15384). HAYMAN ISLAND: C. T. White 10167 (N). COOK ISLANDS: Rarotonga: Parks & Parks 22112 (Ca--393363), 22573 (Ca--393331).

VITEX TRIFOLIA var. BICOLOR f. ALBIFLORA Moldenke, f. nov.

Haec forma a forma typica varietatis corollis albis recedit.

This form differs from the typical form of the variety in having white corollas.

The type of the form was collected by Harold Ernest Parks (no. 16178) at the strand margin, Ohomua, Eua island, Tongan Islands, on June 27, 1926, and is deposited in the herbarium of the University of California at Berkeley. It is described as a bush or shrub 2 m. tall, the trunk 4 cm. in diameter at breast height. It is possible that Evangelista 362 from British North Borneo, cited by me under typical var. bicolor, may also represent this form, since the collector notes that the flowers were "whitish when fresh".

Citations: TONGAN ISLANDS: Eua: H. E. Parks 16178 (Ca—297255-type).

VITEX TRIFOLIA var. SIMPLICIFOLIA Cham.

Additional and emended synonymy: Vitex trifolia var. obovata Benth. ex F. M. Bailey, Compreh. Cat. Queensl. Pl. 386. 1913. Vitex rotundifolius Hara, Outline Phytogeogr. Japan 56, sphalm. 1959. Vitex rotundifolia var. rotundifolia Mizushima, in herb. Vitex trifolia var. ovata Schau., in herb.

Additional literature: Doney, Brooklyn Bot. Gard. Rec. 30: 23. 1941; Neal, In Gard. Hawaii 642, fig. 275. 1948; Ikeda, Journ. Jap. Forest. Soc. 37: 334—335. 1955; Satoo, Biol. Abstr. 30: 2695. 1956; Biol. Abstr. 30: 4370. 1958; Moldenke, Phytologia 6: 183—192 & 197. 1958; Hara, Outline Phytogeogr. Japan 55, 56, 58, & 86. 1959; Moldenke, Résumé 112, 157—159, 166, 167, 171—175, 177, 179, 181, 182, 185, 189, 191, 193, 194, 196, 198, 200, 202, 203, 205, 211, 212, 226, 379, 380, 387, 388, 390, & 479. 1959; O. & I. Degener, Pac. Disc. 14 (5): 15. 1961.

Additional illustrations: Neal, In Gard. Hawaii fig. 275. 1948.

Doney, in the reference cited above, says that the hardiness of this plant cannot be depended on in Brooklyn, New York. Ikeda reports an unidentified species of Bacterium and of Alternaria as parasites on this plant in Japan. The M. R. Henderson 18415 has galled leaves. Recent collectors describe the plant as a prostrate "herb" or strongly aromatic decumbent shrub, sometimes woody and erect, with stems several meters long, rooting at the nodes, the leaves aromatic, green or gray-green above, glaucous-tomentose beneath, and the corollas lavender, mauve, deep-purple, or light-violet, lemon-yellow in the throat.

It is described by collectors as common on coastal dune, sandy beaches, sandbars near shore, sandy places near the seashore, on "top of the beach", and prostrate on sand just above highwater mark. It has been found at altitudes of sealevel to 185 meters (the latter in Chekiang, China).

Additional vernacular names are "homa-go" and "pohinahina". McClure describes it as a "vine creeping on dry beach". The Clemens & Clemens 3028 specimen in the University of California herbarium bears a notation by E. D. Merrill "Vitex trifolia L.; Lour. p. 390 pro parte, quoad habito". The Alexander & Kellogg 5300 label says "not in bloom", but flowers in full anthesis are quite in evidence on the University of California specimen of this number! Chun 212, Pételot 1409, and M. R. Henderson 18415 have petioles longer and more slender than is typical for the variety. The Hcm A.387 [Herb. Lingnan Univ. 18794] cited in Phytologia 6: 197 (1958) as this variety is actually var. subtrisecta (Kuntze) Moldenke.

Additional citations: CHINA: Chekiang: Ching 1967 (Ca--281898). Fukien: H. H. Chung 2031 (Ca--232779). Kwangtung: F. A. McClure 1174 [Herb. Canton Chr. Coll. 13095] (Ca--287863). Shantung: F. N. Meyer 380 (Ca--219004). AMOY ISLAND: A. N. Steward 3044 (Ca--44773). QUELPART ISLAND: In-cho 1124 (Mi). FORMOSA: S. Sasaki s.n. [Kelung, July 31, 1927] (Ca--344332). JAPAN: Honshiu: Dahlstrand s.n. [Kanagawa, 23/9/1950] (Go); Hayakama T.2502 (Ca-320631); Kobayashi 14033 (S), 14133 (S); Lindquist s.n. [Akita, 8/9/1952] (Go), s.n. [Nakagoya, 9/9/1952] (Go); Maruyama & Okamoto 1600 (B, Ca--163615, Go, N, S); Sasaki & Togasi 606 (B, Ca--8635, Go, Mg, S, Vi); S. Suzuki 136 [Sep. 27, 1952; Herb. Suzuki 495014] (Ca--6032). Kiushiu: Ichikawa 200132 [Tanaka 120] (Ca--252182). Island undetermined: Hiroe 5887 [Karo, prov. Inaba] (Ca--809944). KOREA: Mrs. K. R. Smith s.n. [August 1929] (Mi). HONGKONG: Chun 212 (Ca--325762). LANTAU ISLANDS: Tsang 1702 (B, Ca--82298). INDOCHINA: Annam: A. Chevalier 1448 (B); Clemens & Clemens 3028 (Ca--340454); Pételot 1409 (Ca--223788). Cochinchina: Godefroy s.n. [1 Oct. 1875] (B). MALAYA: Pulau Tioman: M. R. Henderson 18415 (Ca--318680). PHILIPPINE ISLANDS: Luzon: De

la Rosa s.n. [Gates 8494] (We); Haenke 576 (N). NEW GUINEA: Dutch New Guinea: H. S. McKee 1769 (Ng—16879). HAWAIIAN ISLANDS: Kauai: A. A. Heller 2731 (Ca—139766); C. H. Hitchcock s.n. (Dt); A. R. Moldenke 86 [H. N. Moldenke 21840] (Z); M. Reed s.n. [Aug. 11, 1905] (Ca, Ca—237091). Lanai: Munro 90 (B). Maui: Topping s.n. [Degener 9504] (B). Molokai: Degener 9506 (B). Oahu: Alexander & Kellogg 5300 (Ca—794938); R. S. Cowan 401 (Ca--964561); O. Degener 10018 (B, B); Fosberg 14184 (Ng—2107); Hatheway & Caindec 139 (Go); M. Reed s.n. [Apr. 13, 1905] (Ca, Ca—237091); Setchell & Setchell s.n. [Kailua Beach, July 12, 1924] (Ca—246961); R. Sin s.n. [Kruckeberg 129] (Du—377938); Topping 3012 (Ca—305369). Island undetermined: C. N. Forbes s.n. (Ca--502395). AUSTRALIA: Northern Territory: Specht 677 (Ng—6500). Queensland: Brass 1919 (B).

VITEX TRIFOLIA var. SUBTRISECTA (Kuntze) Moldenke, comb. nov.

Synonymy: Vitex agnus-castus ß subtrisecta Kuntze, Rev. Gen. Pl. 2: 510 & 511. 1891. Vitex rotundifolia var. heterophylla Mak., Ill. Fl. Nipp. 186. 1940. Vitex trifolia var. heterophylla (Mak.) Moldenke, Phytologia 3: 178. 1949. Vitex trifolia var. subincisa Kuntze, in herb. ? Vitex trifolia var. acutifolia Benth. in Benth. & F. Muell., Fl. Austr. 5: 67. 1870.

Additional literature: Benth. in Benth. & F. Muell., Fl. Austr. 5: 67. 1870; F. M. Bailey, Compreh. Cat. Queensl. Pl. 386. 1913; Moldenke, Phytologia 6: 180—183. 1958; Moldenke, Résumé 157, 165, 166, 171, 173—175, 177, 178, 181, 182, 185, 189, 191, 195, 198, 200, 202, 206, 207, 211, 226, 380, 388, 390, & 478. 1959.

Recent collectors describe this plant as a spreading bush or shrub, 1 to 4 m. tall , or less, of rather straggling growth when not kept trimmed, or a small tree to 6.5 m. tall, often spreading to 2 m.; trunk irregular; stems to 4 cm. in diameter; leaves dull-green and aromatic or very pale-green to even whitish beneath; flowers with a spicy fragrance; corollas bilabiate, pale-purple, purple, reddish-purple, light-purplish, or purplish-blue to pale-blue, lilac, orchid-color, heliotrope, or pale-blue with a white throat, the labellum dark-purple above; filaments pale-blue or pale-purple; anthers deep-purple; style pale-blue; unripe fruit green.

It has been found in anthesis also in January, May, September, and November, and in fruit in May and from October to December. Smith found it as 900 meters altitude in the Fiji Islands; it has been cultivated at 4000 feet in New Guinea and is wild (escaped?) at 6000 feet there. On Papua it is said to grow among littoral vegetation very close to the mangroves, while in Northeastern New Guinea it is said to be very common on the sandy banks of rivers; in Fiji it grows on grass-covered slopes. It is very often cultivated as a hedge plant in the Hawaiian Islands, where it was observed by my wife, my son, and myself many times in August and

September, 1961. In Queensland it occurs on golf courses and is widely planted as a hedge; on Rurutu it occurs along roadsides near the beaches. Smith reports it as growing in dense stands and H. E. Parks on open hillsides on Viti Levu and on open slopes on Vanua Levu. The Banghams encountered it in rocky pasture land on Sumatra at 3800 feet altitude, where, they say, it is often used for hedges by the natives.

Vernacular names recorded for it are "kabubu", "lagondee", "lagundi", "ndrala", "salah puteh", "salt-bush", "tanamanasukwiri", and "tarirapito". Moninger reports it as used in medicine on Hainan Island and refers to the fruit as "a hard berry" (actually, it is a drupe). The "flowers" are said to be "green" by Native collector [Muka Hill ground, 20.1.28], but surely this is an error for "fruit".

Herbarium material has been misidentified and distributed as V. negundo L., V. rotundifolia L. f., V. trifoliata L., V. trifolia L. and its var. ovata Thunb., var. simplicifolia Cham., var. unifoliolata Schau., and var. variegata Moldenke. Buchholz 1536 was originally identified as "a plant of the mint family". The A. C. Smith 4559, cited below, was erroneously cited by me in Phytologia 6: 173 (1958) as typical V. trifolia, as was also Menninger s.n. [Stuart, April 17, 1945] on page 174, while Hom A.387 was erroneously cited on page 197 as var. simplicifolia.

It appears to me now that I was in error in adopting Makino's epithet "heterophylla" for this taxon in Phytologia 6: 180--183 (1958). Makino's V. rotundifolia var. heterophylla was published by him in 1940 and I have not as yet been able to see the type. It probably applies to this taxon, but even if it does, Kuntze's validly published epithet antedates it by 49 years and must be used. Kuntze's type has been examined by me and is not "typical V. trifolia" as stated by me in Phytologia 6: 172. Linnaeus' type of V. trifolia, also examined by me, definitely shows all the leaflets distinctly long-petiolulate. It seems to me that the trifoliolate specimens with sessile leaflets, previously regarded as typical V. trifolia, must be excluded from that taxon and placed in var. subtrisecta, which has its leaves either 1- or 3-foliolate. When only 1-foliolate, the leaflet is distinctly long-petiolate, while in var. simplicifolia it is sessile, subsessile, or very short-petiolate.

J. W. Gillespie 4380, M. S. Clemens 11067bis, Collector undesignated 902, Hiroe 13289, and Moninger 219 have the leaves all 1-foliolate and give the appearance of a long-petiolate form of var. simplicifolia.

Bentham, in the reference cited above, describes his var. acutifolia as decumbent or erect; leaflets 3 or sometimes 5 or only 1, ovate or ovate-lanceolate, acute or acuminate, the middle one often above 2 inches long. I strongly suspect that this is the same taxon which we are now calling var. subtrisecta, but not hav-

ing seen the type as yet, I hesitate to say so definitely. If it proves to be the same, then Bentham's varietal name will have to be the one adopted as the oldest one in that category.

Additional citations: FLORIDA: Monroe Co.: Stern & Brizicky 301 (Du--418359). BURMA: Shan States: Rock 2325 (Ca--264322). CHINA: Kwangtung: F. A. McClure 1208 [Herb. Canton Chr. Coll. 13131] (Ca--287641). FORMOSA: Collector undesignated 902 (Ca--345188). JAPAN: Honshiu: Hiroe 13289 (Ca--180307). HAINAN ISLAND: Fung 20300 (B, Ca--11545); Lau 270 (B, Ca--525029). INDOCHINA: Annam: Eberhardt 3291 (B). Laos: F. K. Ward 8929 (N). State undetermined: Thoral 2092 (Ca--53760). PHILIPPINE ISLANDS: Luzon: Elmer 15236 (Ca--272331, Um--170). SUMATRA: Bangham & Bangham 615 (N), 806 (N); Boesa 551 (N); Torres 910 (Ca--42233). JAVA: Kuntze 5817 (N--type). JAMBONGAN ISLAND: Cabiling 3691 [555] (Ca--347149). SARAWAK: Native collector s.n. [Muka Hill ground, 20.1.28] (Ca--357311). LESSER SUNDA ISLANDS: Timor: Herb. Mus. Paris s.n. [Timor] (T). NEW GUINEA: Northeastern New Guinea: M. S. Clemens 11067 bis (Ca--180821); Hoogland 5172 (Ng--8325); Womersley 4711 (Ng--16953). Papua: J. C. Saunders 127 (Ng--16823). HAWAIIAN ISLANDS: Kauai: H. N. Moldenke 21847 (Z). Molokai: H. N. Moldenke 21832 (Z). SOLOMON ISLANDS: Bougainville: Waterhouse 60 [Herb. Mus. Yale School Forest. 22664] (N). NEW CALEDONIA: J. T. Buchholz 1536 (Ca--799426); C. Skottsberg 5 (Go). LOYALTY ISLANDS: Franc 1024 (N). FIJI ISLANDS: Vanua Levu: A. C. Smith 6610 (N). Viti Levu: J. W. Gillespie 4380 (Ca--448812); H. E. Parks 20800 (Ca--447572); A. C. Smith 4559 (N, S), 6078 (N). SAMOAN ISLANDS: Tutuila: Kuntze 23006 (N). AUSTRALIA: Northern Territory: Specht 42 (Ng--6589). Queensland: M. S. Clemens s.n. [12 November 1948] (Mi); Podenzana s.n. [Cooktown, 4.5.1892] (Go). AUSTRAL ISLANDS: Rurutu: Chapin 853 (N). CULTIVATED: Australia: C. T. White 12402 (Ca--937616). China: Hcm A.387 [Herb. Lingnan Univ. 18794] (N). Florida: Buswell s.n. [Miami, June 14, 1941] (Gg--339298); Moninger s.n. [Stuart, April 17, 1945] (N). Hainan Island: Moninger 219 (Ca--223866). Hawaiian Islands: O. Degener 9505 (N). Java: Kuntze 4448 (N). Malaya: Haniff 29 (Ca--355172). New Guinea: M. S. Clemens 8209 (B). LOCALITY OF COLLECTION UNDETERMINED: Blackburn s.n. (T).

VITEX TRIFOLIA var. SUBTRISECTA f. ALBIFLORA Moldenke, f. nov.

Haec forma a forma typica varietatis corollis albis recedit.

This form differs from the typical form of the variety in having white corollas.

The type of the form was collected by Harold Saint John (no. 16705) on top of a coral sand beach, altitude 2 meters, Peva, Rurutu island, Austral Islands, on August 28, 1934, and is depos-

ited in the herbarium of the University of California at Berkeley. The collector notes that the plant was forming a thicket and was in the form of a shrub 3 m. tall. It has been distributed as V. trifolia var. trifoliolata Schau.

Citations: ASUTRAL ISLANDS: Rurutu: H. St. John 16705 (Ca—805710—type).

VITEX TRIFOLIA var. VARIEGATA Moldenke

Additional literature: Neal, In Gard. Hawaii 641. 1948; Moldenke, Phytologia 6: 198. 1958; Moldenke, Résumé 226 & 479. 1959.

Collectors describe this as a shrub, to 4 m. tall, the leaves variously variegated or only slightly edged with white, and the corollas blue. It has been found blooming in March, August, and September. Kajewski reports it as common in the rainforest on the New Hebrides, where it occurs also in native gardens. It is very extensively cultivated as a hedge on the Hawaiian Islands, where it was observed many times by my wife, my son, and myself in August and September, 1961.

Actually this taxon is a form of V. trifolia var. subtrisecta, but in keeping with widespread horticultural practice to simplify nomenclature of strictly horticultural subjects, it is here regarded as a "variety".

Additional citations: HAWAIIAN ISLANDS: Kauai: H. N. Moldenke 21848 (Z). Maui: H. N. Moldenke 21825 (Z). Oahu: H. N. Moldenke 21862 (Z). CULTIVATED: Florida: Godfrey 58162 (N); P. O. Schallert 23077 (S). New Hebrides: Kajewski 84 (N).

VITEX TRIPINNATA (Lour.) Merr.

Additional literature: Moldenke, Phytologia 6: 198—200. 1958; Moldenke, Résumé 175, 177, 179, 274, 353, 355, 381, 385, 419, & 479. 1959.

Collectors describe this as a medium-sized tree, with "sweeping" branches, yellowish blaze, and scented, white and yellow flowers, blooming in March and April, and fruiting in August, scattered in open deciduous forests. Contrary to what is said in Phytologia 6: 199 (1958) the calyx in this typical form of the species is entirely glabrous or essentially so. The Clemens & Clemens 3394, Poilane 17 and 17901, and Bejaud 223 cited on page 200 are all actually var. clemensorum, the first-mentioned being the type collection of that variety.

An additional vernacular name is "neklek maknoi". Bejaud 223 in the Berlin herbarium is a mixture with some non-verbenaceous material; Poilane 8565, in the same herbarium, is labeled "Vitex annamensis", but is not verbenaceous — it seems, rather, to be something in the Malvaceae.

V. tripinnata has been collected at 600 meters altitude of 600 meters. Herbarium material has been misidentified and distributed as V. peduncularis Wall.

Additional citations: INDOCHINA: Annam: Colani 4040 (Ca—320420) Poilane 2747 (B), 11261 (B), 22253 (B, Ca—53968). Cambodia: Be-

Jaud 223, in part (B). Cochinchina: Poilane s.n. [Arboretum de Trang-bom] (B). Tonkin: Pételot 4040 (Ca—54798). State undetermined: Eberhardt 4054 (B); Pierre s.n. (B). THAILAND: Charoenmayu 386 [Royal Forest Dept. 5466] (Sm).

VITEX TRIFINNATA var. CLEMENSORUM Moldenke, var. nov.

Haec varietas a forma typica speciei calyce extus dense aureo-glanduloso recedit.

This variety differs from the typical form of the species in having the calyx densely golden-glandulose on the outer surface.

The type of the variety was collected by Joseph and Mary Knapp Clemens (no. 3394) in open ground along a river by a forestry lodge and native house at Tourane, Annam, Indochina, between June 4 and 13, 1927, and is deposited in the herbarium of the University of California at Berkeley.

Previous to this writing I had not distinguished between the very glandulose and the glabrous forms of this species. Certain of the specimens cited by me in Phytologia 6: 200 (1958) as representing the typical form of this species actually belong to this variety, as cited below. It is said to be a common tree with yellow flowers in June.

Citations: INDOCHINA: Annam: Clemens & Clemens 3394 (Ca—339489—type, N—isotype, Ut—104a—isotype); Poilane 17 (N), 17901 (N). Cambodia: Bejaud 223, in part (N).

VITEX UMBROSA Sw.

Additional literature: Moldenke, Phytologia 6: 201—203. 1958; Moldenke, Résumé 56, 321, & 479. 1959.

Additional citations: JAMAICA: W. Harris 11975 (Vi).

VITEX URCEOLATA C. B. Clarke

Additional literature: Moldenke, Phytologia 6: 205—206. 1958; Moldenke, Résumé 165, 166, 171, 172, 179, 181, 189, 191, 194, 320, 384, 385, 389, & 479. 1959.

Recent collector describe this tree as having a trunk diameter of 12 inches, gray bark, cut whitish, white flowers, and globose fruit which is green when immature and black when mature. They report the tree to be common in lowland evergreen forests and at the edge of forests, at altitudes of 100 meters, flowering in June, and fruiting in September. Specimens have been misidentified in herbaria and distributed as V. glabrata R. Br.

Additional citations: ANDAMAN ISLANDS: South Andaman: Prain's collector 29 (N—photo). INDOCHINA: Tonkin: Bon s.n. (Ca—53985). THAILAND: Thaworn 452 [Herb. Roy. Forest Dept. 14552] (Z). SUMATRA: Yates 1609 (Ca—263943).

VITEX VANSTEENISI Moldenke

Additional literature: Moldenke, Phytologia 6: 206—207. 1958; Moldenke, Résumé 189 & 479. 1959.

Additional citations: SUMATRA: Van Steenis 9400 (N—isotype).

VITEX VAUTHIERI P. DC.

Additional literature: Moldenke, Phytologia 6: 207—209. 1958; Moldenke, Résumé 112, 237, 341, 389, & 479. 1959.

Additional citations: CULTIVATED: Brazil: Rose & Lutz 44 [Herb. Nac. Rio de Jan. 52493] (Gg—366795).

VITEX VELUTINA (Koord. & Val.) Koord.

Additional literature: Moldenke, Phytologia 6: 209—210. 1958; Moldenke, Résumé 185, 189, 191, 384, & 479. 1959.

Additional citations: JAVA: Koorders 24703b (Ca—265985—cotype).

VITEX VERMOESENI DeWild.

Additional literature: Moldenke, Phytologia 6: 211—213. 1958; Moldenke, Résumé 143 & 479. 1959.

Additional citations: CONGO: Vermoesen 1742 (Ca—6192—cotype, Z—cotype), 1933 (Ca—6190—cotype).

VITEX VESTITA Wall.

Additional literature: Moldenke, Phytologia 6: 213—216. 1958; Moldenke, Résumé 165, 166, 171, 177, 179, 181, 187, 189, 191—194, 198, 226, 383, 385, 386, 390, 391, & 479. 1959.

Recent collectors describe this plant as a bush or shrub 2.5—4 m. tall, with dark-green leaves that are dull to slightly glossy above, paler and dull beneath with brownish-green midrib and veins, and fruit green when immature (June). Sinclair found it along wooded paths on steep hillsides in Perak. It is found in forests on Sumatra, and is said to be common in deciduous forests in Thailand, growing at altitudes of 25 to 3000 meters, blossoming also in February, March, June, July, and November.

Additional vernacular names are "khot ngu" and "phahai noi". Its roots are employed in Thailand against snakebites. It has been misidentified by Dop as V. sumatrana var. urceolata King & Gamble.

Additional citations: INDOCHINA: Tonkin: Bon 6202 (B). MALAYA: Johore: Nur & Kiah bin Hadji 7742 (Ca—2311469). Negri Sembilan: Nur 11508 (Ca—346227). Pahang: Best 13892 (Ca—237335). Perak: J. Sinclair 9887 (N). Selangor: Murdoch s.n. [Gombak, 1900] (Ca—267599); Nur 34436 (Ca—3289). THAILAND: Bunpheng 864 (Gg); Nilphanit 35 [Royal Forest Dept. 10775] (Z). SUMATRA: Boeea 7049 (Ca—14662); Toroes 284 (Ca—42264), 4497 (Ca—530917, S); Yates 1648 (Ca—264070), 2140 (B, Ca—300515). BRITISH NORTH BORNEO: M. S. Clemens 11172 (Ca—214991), 51590 (Ca—541713); Clemens & Clemens 26679 (Ca—541269), 29768 (B, Ca—541962, Ur).

VITEX VESTITA f. GLABRESCENS Moldenke

Additional literature: Moldenke, Phytologia 6: 216. 1958; Moldenke, Résumé 189 & 479. 1959.

Additional citations: SUMATRA: Toroes 4698 (Ca—530521—isotype).

VITEX VESTITA f. WINKLERI Moldenke

Additional literature: Moldenke, Phytologia 6: 217. 1958; Moldenke, Résumé 189, 192, 194, & 479. 1959.

This plant has been collected in fruit in October. Herbarium material has been distributed as V. vestita Wall.

Additional citations: BRITISH NORTH BORNEO: M. S. Clemens 9813 (Ca--214990).

VITEX VOLKENSII Gürke

Additional literature: Moldenke, Phytologia 6: 218--219. 1958; Moldenke, Résumé 143, 145, 146, 383, 384, & 479. 1959.

Schlieben describes this as a small tree, 12--15 m. tall, with hard wood, and the stamens not exserted, growing at 1200 m. altitude.

Additional citations: TANGANYIKA: Scheffler 199 [A. Peter 51814] (B); Schlieben 3221 (B), 5910 (B).

VITEX WELWITSCHII Gürke

Additional literature: Moldenke, Phytologia 6: 223. 1958; Moldenke, Résumé 139, 143, 145, 148, 149, 151, 385, 389, & 479. 1959.

Donis collected this plant in fruit in October.

Additional citations: CONGO: Donis 2931 (Ca--55590); Louis 2163 (Vi), 3513 (B).

VITEX WILMSII var. REFLEXA (H. H. W. Pearson) Pieper

Additional synonymy: Vitex wilmsii var. reflexa H. H. W. Pearson, in herb.

Additional literature: Moldenke, Phytologia 6: 225--227. 1958; Moldenke, Résumé 152, 154, 388, & 479. 1959.

Recent collectors describe this as a bush, 8 feet tall, growing in thorn veld areas in Swaziland and locally frequent on rocky slopes in Transvaal, flowering in October.

Additional citations: SWAZILAND: Rodin 4544 (Ca--802799). UNION OF SOUTH AFRICA: Transvaal: E. E. Galpin 282m (Ew); Meeuse 10259 (S).

VITEX YUNNANENSIS W. W. Sm.

Additional literature: Moldenke, Phytologia 6: 228--229. 1958; Moldenke, Résumé 171 & 479. 1959.

Recent collectors describe this as a small tree, with violet flowers, growing in "hot regions", alpine regions, and near river-banks, sometimes as low as 900 meters altitude.

Additional citations: CHINA: Szechuan: J. F. C. Rock 5529 (Ca--326752), 23725 (Ca--516551), 24298 (Ca--516550). Yunnan: Maire 3647 (Ca--386798); Forrest 11349 (Ca--231330); J. F. C. Rock 5063 (Ca--327150), 10564 (Ca--327553).

VITEX ZENKERI Gürke

Additional literature: Moldenke, Phytologia 6: 230. 1958; Moldenke, Résumé 139, 143, & 479. 1959.

Additional citations: CAMEROONS: Zenker 139 (B), 5315 (Ca--

620431).

VITEX ZEYHERI Sond.

Additional literature: Moldenke, Phytologia 6: 230—231. 1958; Moldenke, Résumé 152, 154, & 479. 1959.

Recent collectors describe this as a tree, 6 m. tall, with cream-colored flowers, common in Transvaal at altitudes up to 4350 feet.

Additional citations: UNION OF SOUTH AFRICA: Transvaal: Mogg s.n. [6/4/1935] (S); Schlieben 7733 (B); Wasserfall & von Niekerk 4 (S).

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. I

Harold N. Moldenke

This is the twenty-eighth in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, and Symphoremaceae. Previous genera so treated were Acantholippia Griseb., Aegiphila Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Dicstea Miers, Dipyrena Hook., Hierobotana Briq., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Stylodon Raf., Svensonia Moldenke, Tectona L. f., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 260 herbaria whose material was examined, in whole or in part, in the preparation of these works will be found in Phytologia 5: 154—159 (1955), 6: 242 (1958), 7: 91—92 (1959), 7: 123—124 (1960), and 7: 343 (1961) with the addition of Ko = Botanisches Institut der Universität, Köln, Germany.

VERBENA L., Sp. Pl., ed. 1, 18. 1753; Gen. Pl., ed. 5, 12. 1754 [not Verbena Dill., 1763, nor Pluk., 1763].

Synonymy: Obletia Rozier, Introd. Obs. Phys. Hist. Nat. 1: 367. 1773. Verbena Tourn. ex Adans., Fam. Pl. 2: 12 & 198. 1763. Patya Neck., Elem. Bot. 1: 296. 1790. Aubletia Neck., Elem. Bot. 1: 356—357. 1790. Glandularia J. F. Gmel. in L., Syst. Nat., ed. 13, 2 (2): 920. 1791. Billardiera Moench, Meth. Pl. 369. 1794. Shuttleworthia Meisn., Pl. Vasc. Gen. 1: 290 and 2: 198. 1839. Uwarowia Bunge, Bull. Sci. Acad. St. Pétersb. 7: 278. 1840. Schuttleworthia Meisn. apud Schau. in A. DC., Prodr. 11: 535, in

syn. 1847. Shuttlworthia Walp. apud Schau. in A. DC., Prodr. 11: 553, in syn. 1847. Aubletia Jacq. apud Wittstein, Etymolog.-bot. Handwörterb. 85. 1852. Uerbena Sessé & Moc., Pl. Nou. Hisp. 1: 6. 1887. Helleranthus Small, Fl. Southeast. U. S., ed. 1, 1011 & 1337. 1903. Veebena Vent. ex Moldenke, Alph. List Cit. 1: 98, sphalm. 1946. Verebna Augusto, Fl. Rio Grande do Sul 217, sphalm. 1946. Verbenia L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 28, in syn. 1947. Vernena L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 28, in syn. 1947. Verbent L. apud Deam, Yuncker, & Friesner, Proc. Ind. Acad. Sci. 58: 95, sphalm. 1948. Verben Perry & Fernald ex Moldenke, Alph. List Cit. 2: 584, sphalm. 1948. Grandularia Martínez Crovetto & Piccinini, Revist. Invest. Agric. 4: 77, sphalm. 1951. Verbina L. ex Moldenke, Résumé 379, in syn. 1959. Glandulosa Penfound, in herb. Verbinia Wahlgent, in herb.

Literature: Clus., Rar. Stirp. Hisp. Obser. Hist. 2: 372—373. 1576; C. Bauhin, Pinax Theatr. Bot., ed. 1, 269. 1623; Herm., Parad. Bat. 242, pl. 242. 1705; Herm., Cat. Plant. Nond. 15.1705; Feuill., Journ. Obs. Phys. Côtes Orient. [3]: 35—37, pl. 25, fig. 1—3. 1725; Dill., Hort. Eltham. 406—408, pl. 300—302, fig. 387—389. 1732; L., Syst. Nat., ed. 1, xxxv. 1735; L., Hort. Cliff. 11. 1737; Clayt., Fl. Virg. 8. 1743; L., Hort. Upsal. 8. 1748; Haartm., Pl. Hybr. 7—8. 1751; L., Sp. Pl., ed. 1, 18—21 & 630. 1753; L., Gen. Pl., ed. 5, 12. 1754; Haartm. in L., Amoen. Acad. 3: 35 & 43, pl. 2. 1756; Printz in L., Amoen. Acad. 6: 81. 1760; L., Syst. Nat., ed. 10, 2: 851—852. 1759; L., Sp. Pl., ed. 2, 29. 1762; Adans., Fam. Pl. 2: 12 & 198. 1763; Kniphof, Herb. Viv. 2: no. 98, pl. 1155—1158. 1764; Jacq., Obs. Bot. 1: 37, pl. 24. 1764; L., Mant. 88. 1767; N. L. Burm., Fl. Ind. 12, pl. 6, fig. 2. 1768; N. L. Burm., Fl. Cap. Prodr. 1. 1768; N. L. Burm., Fl. Ind., [ed. 2], 12, pl. 6, fig. 2. 1768; Mill., Gard. Dict., ed. 8, no. 1—18. 1768; Jacq., Obs. Bot. 4: 7, pl. 85 & 86. 1771; Curtis, Fl. Lond., ed. 1, 1 (1): pl. 41. 1772; Jacq., Hort. Vindob. 1: pl. 176 and 2: 82. 1772; Retz., Svenska Vet. Akad. Stockh. Nya Handl. 34: 143—144, pl. 5. 1773; Rozier, Introd. Phys. Hist. Nat. 1: 367, pl. 2. 1773; Dill., Hort. Eltham. Add. Denom. Linn. 406, pl. 300—302, fig. 387—389. 1774; Regnault, Bot. 1: 112. 1774; Murr. in L., Syst. Veg., ed. 13, 62. 1774; Fl. Dan. 4: pl. 628. 1775; Medic., Act. Acad. Theod.-Palat. 3 (Phys.): 194, pl. 7. 1775; Forsk., Fl. Aegypt.-arab. 10. 1775; Aubl., Hist. Pl. Guian. Franç. 1: 16. 1775; Hasselt, Etymol. Teut. Ling. 1777; Walcott, Fl. Brit. Indig. [pl. 92]. 1778; Christm., Pflanzensyst. 5: 127. 1779; Houttuyn, Linn. Pfl. Syst. 5: 127. 1779; Zorn, Ic. Pl. Med. 1: pl. 38. 1779; Jacq., Select. Stirp. Amer. Hist. Picta pl. 9. 1780; Bulliard, Herb. France 3 & 4: pl. 215. 1780—1793; Houst., Reliq. 3: pl. 2. 1781; De Gorter, Fl. Prov. Belg. Fed. 7: 8 & 364. 1781; L., Suppl. 86—87. 1781; Buchoz, Herb. Col. Amér. [pl. 31, 44, & 87]. 1783; Medic., Bot. Beobacht. 1783: 131. 1784; Gilib., Fl. Lituan. 1: 92. 1785; L'Hér., Stirp. Nov. 21—24, pl. 11 & 12. 1786; Walt., Fl. Carol. 164. 1788; Jacq., Coll. 2: 334—335. 1788; Plenck, Ic. Pl.

Med. 1: pl. 17. 1788; Gaertn., Fruct. & Sem. 1: 315, pl. 66. 1788; Jacq., Icon. Pl. Rar. 2: pl. 207 & 208. 1789; A. L. Juss., Gen. Pl. 109. 1789; Hoppe, Ect. Pl. Ratisb. pl. 332. 1789; P. Browne, Civil & Nat. Hist. Jamaic., ed. 2, pl. 3. 1789; Neck., Elem. Bot. 1: 295—296 & 356—357. 1790; J. F. Gmel. in L., Syst. Nat., ed. 13, 2 (2): 920. 1791; Lam., Tabl. Encycl. Méth. Bot. [Illustr.] 1: 57, pl. 17, fig. 1 & 2. 1791; Bart., Trav. 436. 1791; G. F. Hoffm., Deutsch. Fl. pl. 2. 1791; L. C. Rich., Act. Soc. Hist. Nat. Paris 1: 105. 1792; C. K. Spreng., Entd. Geheimn. Natur pl. 1, fig. 14—16, 21, & 23. 1793; Nemnich, Allgem. Polyglott. Lex. 1793—1795; Moench, Meth. Pl. 369. 1794; Woodville, Med. Bot. Suppl., ed. 1, pl. 218. 1794; Usteri, Ann. Bot. 9: pl. 2. 1794; Vahl, Symb. Bot. 3: 6. 1794; Curtis, Bot. Mag. 9: pl. 308. 1795; Dreves & Hayne, Bot. Bilderbuch 2: pl. 45. 1795; Oakamp, Afb. Artseny-Gewass. 1: pl. 38. 1796; R. A. Salisb., Prodr. 71. 1796; Jacq., Hort. Schönbr. 1: 3, pl. 5. 1797; Curtis, Bot. Mag. 11: pl. 367. 1797; Ort., Hort. Matr. Dec. 2. 1797; Willd., Sp. Pl. 1: 115—120. 1797; Sturm, Deutschl. Fl. 1 (3): [pl. 34]. 1797; Ruiz & Pav., Fl. Peruv. & Chil. 1: 20—23, pl. 32—34. 1798; Vahl, Eclog. Amer. 2: 2. 1798; Vahl, Icon. Pl. Amer. 2: pl. 11. 1799; Vent., Descr. Pl. Jard. Cels. 53, pl. 53. 1800; Sowerby & Sm., Engl. Bot. 11: pl. 767. 1800; Kops, Fl. Batava 1: pl. 31. 1800; Thunb., Prodr. Fl. Cap. 96. 1800; Lag. & Rodr., Anal. Cienc. Nat. 4: 260. 1801; A. Rich. in Marthe, Cat. Pl. Jard. Méd. Paris 67. 1801; Dreves & Hayne, Choix de Pl. pl. 45. 1802; Moench, Meth. Suppl. 131. 1802; Cav., Descr. 68. 1802; G. Savi, Soc. Ital. Mem. Mat. & Fis. 9: 349, pl. 7. 1802; Mirbel, Hist. Nat. Pl. 15: pl. 103. 1802—1806; Vent., Jard. Malm. pl. 36. 1803; Michx., Fl. Bor.-Am. 2: 13—14. 1803; Vahl, Enum. Pl. 1: 208. 1804; Svensk Bot. 3: pl. 182. 1804; G. Savi, Mat. Med. Veg. Toscana pl. 52. 1805; Roth, Catalect. Bot. 3: 3. 1806; Bertol., Rar. Ital. Pl. Dec. 2: 27. 1806; A. L. Juss., Ann. Mus. Nat. Hist. Paris 7: 73. 1806; Andr., Bot. Rep. 7: pl. 435. 1806; Moriarty, Viridiarum Col. Plates Greenh. Pl. pl. 49. 1806; Poir. in Lam., Encycl. Méth. Bot. 8: 546—550 & 843—844. 1808; Roques, Pl. Usuel. Indig. & Exot. 2: pl. 59. 1808; Schkuhr, Bot. Handb., ed. 2, pl. 3. 1808; Raf., Med. Repos. N. Y., ser. 2, 5: 352 & 360. 1808; Duham., Arbres & Arbust., ed. 2, 4: pl. 6. 1809; Willd., Enum. Hort. Berol. 632—633. 1809; Jaume St.-Hil., Pl. France 4: [pl. 89]. 1809; Mirbel, Ann. Mus. Hist. Nat. Paris 15: 260, pl. 14 (2), fig. 1—5 & 7. 1810; R. Br., Prodr. Fl. Nouv. Holl., ed. 1, 514. 1810; A. & F. Plée, Herbor. Paris [pl. 27]. 1811; Ait., Hort. Kew., ed. 2, 4: 38—42. 1812; Hill, Family Herbal pl. 49. 1812; Vigneux, Fl. Pitt. Envir. Paris pl. 1. 1812; P. Beauv., Mém. Inst. France 12: 157 & 162, pl. 1. 1812; Stokes, Bot. Mat. Med. 1: 38. 1812; Thornton, Brit. Fl. 1: 27. 1812; Titford, Sketches Hort. Bot. Amer. pl. 4. 1812; Spreng., Pl. Min. Cog. Pugill. 2: 70. 1813; Schrank, Fl. Monac. 2: pl. 135. 1814; Lag., Gen. & Sp. Nov. 18—19. 1816; Dict. Sci. Nat. Planch. Bot. Dicot. pl. 39. 1816—1829; Curtis, Fl. Lond., ed. 2, 1 (1): pl. 41. 1817; Hopkirk, Fl. Anom. pl. 7, fig. 5 & 6. 1817; J. Sm. in Rees, Cycl. 36, no. 1—28. 1817; H.B.K., Nov. Gen. & Sp. Pl. 2: pl.

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AN OBSERVATION CONCERNING THE DEVELOPMENT OF EXCISED SNAPDRAGON BUDS IN THE PRESENCE OF RESPIRATORY INHIBITORS

Brown, H. D.[1] and H. J. Dupuy

During a study involving the isolation of young snapdragon buds from the stem and their maintenance, floating, upon solutions containing respiratory inhibitors (Brown, 1959) it was noted that frequently abnormal development would occur. More interesting, the activity of several inhibitors resulted in flowers which were characteristically misshapen to give what might be described as a gaping appearance.

The fact of interference with the metabolism of the developing floral parts by known respiratory inhibitors is not in itself, of course, particularly surprising. Had the outcome of contact with the inhibitors been solely a slowing down of the pattern of development or its cessation, this would have accorded with expectation. But the regular peculiarity of the resulting malformation, indicating a specialized or localized activity by the inhibitors, led us to seek information about the developmental pattern of the flowers in this abnormal environment.

MATERIALS AND METHODS

Snapdragons, *Antirrhinum majus* L. cultivar. Candlelight, a tetraploid, were grown to flowering under greenhouse conditions. The young buds, averaging about 15 mm. were carefully cut from the plant and, after the sepals were coated with low melting-point paraffin, were mounted on lucite plates with the floral stalks protruding through holes drilled in the plates. The mounting was sealed with additional paraffin so that when the plates were floated, only the floral stalks would be in

[1] PRESENT ADDRESS: BOTANY DEPARTMENT, SOUTHERN ILLINOIS UNIVERSITY, EDWARDSVILLE, ILLINOIS.

contact with test solutions for approximately 72 hours. Record of development was made by time-lapse photography.

A Grass kymograph motion picture camera was actuated by a rotary switch adjusted to expose one frame every twenty minutes. The light of three one-hundred-watt lamps, diffused, provided illumination. Exposure was f22 for 1 second with Eastman pantomic-x film.

Buds were floated on test solutions in small glass vessels. The vessels and buds, enclosed within the humid atmosphere, provided by a glass aquarium tank, were photographed through the wall of the tank. Solutions were 10 percent sucrose for controls, 10 percent sucrose and either .1 or .05 percent sodium azide for the experimental plants.

In the earlier study, which had not been directed toward floral morphology, twelve inhibitors had been applied under conditions similar to those described here.

RESULTS AND DISCUSSION

It had been noted that at .1 percent concentration, sodium arsenate, sodium azide, and sodium fluoride caused, with varying intensity, a characteristic deformity of developing excised snapdragon flowers. In the photographic observations .05 as well as .1 percent concentrations of sodium azide were found effective.

Study of the photographs indicates that it is abnormality of the upper lip of the bilabiate corolla which is largely responsible for the character of the "gaping" flower. Figure 1 illustrates this type of flower with its upper lip folding backward so that essential parts are largely exposed where they would be concealed by erect stature of the upper lip in normal flowers.

Azide inhibition, frequently linked to phosphate transfers (James, 1953), might be expected to affect petal development.

The present observations are, of course, amenable to more than a single hypothesis. The characteristic malformation may result from

the indirect effect upon an auxin transport system or, more simply, relate to the distribution of inhibitor consequent upon the vascular anatomy of the flower.

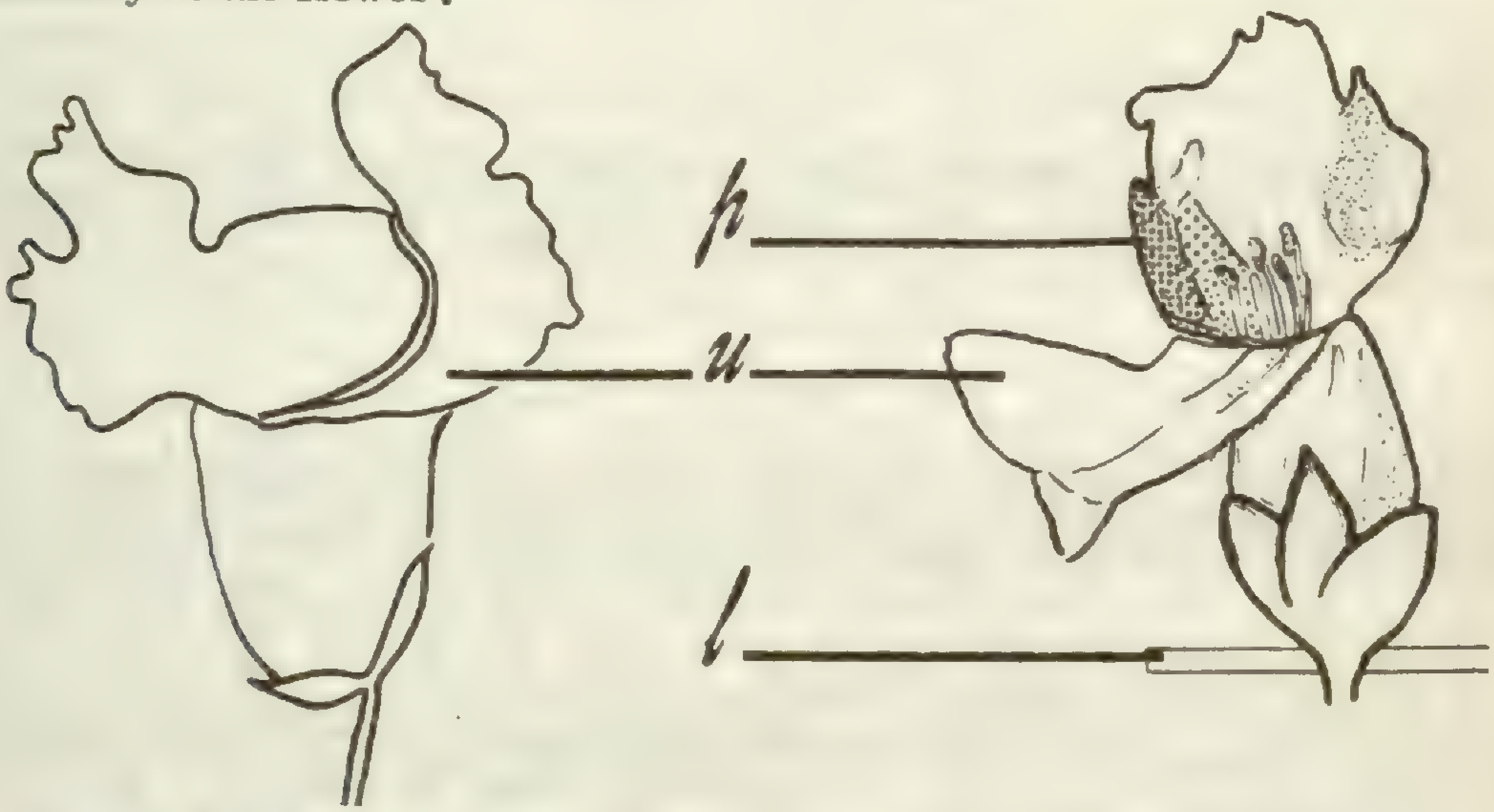

Figure 1. Normal and 'gaping' flowers (l, lucite plate; u, upper lip; p, palate).

The authors find attractive also the possibility that a relationship of endogenous respiration to the efficacy of the inhibitor is involved. Siegelman, Chow, and Biale (1958) found, in rose, that the effectiveness of a metabolic agent, was inversely related to the respiratory rate of the tissues. Hence it seems not unlikely that, within the petal, localized differences in endogenous rates could, with the inhibitor present, effect the developmental pattern reported here.

Loyola University, New Orleans

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. II

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VERBENA L.

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Herbs, sometimes slightly woody at the very base; stems and branches procumbent, ascending, or erect, glabrous or variously pubescent; leaves mostly decussate-opposite, rarely whorled, dentate (very rarely entire) or variously lobed, incised, or pinnatifid; inflorescence spicate; spikes terminal, usually densely many-flowered, often flat-topped and pseudo-umbellate or fasciculate-capitate, sometimes greatly elongate with densely crowded or scattered flowers, very rarely also axillary, often greatly elongating only after anthesis; flowers small or medium-sized, each solitary in the axil of a usually narrow bractlet; calyx gamosepalous, inferior, usually tubular, 5-angled, 5-ribbed, unequally 5-toothed at the rim, not at all or but slightly changed in fruit; corolla gamopetalous, inferior, salver-form or funnel-form, its tube cylindric, straight or curvate, often slightly ampliate or subinflated at the apex, usually villous at the stamen-insertion within and barbate at the mouth, the limb flat, spreading or oblique, weakly 2-lipped, the lobes 5, usually rather elongate, more or less unequal, varying from obtuse or rounded to emarginate at the apex, the 2 posterior outermost and the anterior one innermost in prefloration; stamens 4, didynamous, inserted in the upper half of the corolla-tube, included; anthers ovate, with 2 parallel or slightly divergent thecae, dehiscing by means of a longitudinal slit, the dorsal connective unappendaged and narrowly muticous or provided with a more or less conspicuous glandular appendage; style single, usually short and equaling the stamens, somewhat dilated, shortly 2-lobed or bifid at the apex, the anterior lobe or branch stigmatiferous and subpulvinate-papillose, the posterior lobe or branch smooth and horny and non-stigmatiferous, not as broad as the

anterior one; ovary superior, compound, 2-carpellary, entire at the apex or 4-lobed, situated on a somewhat lobed annular disk, completely 4-celled even at time of anthesis, with one ovule in each cell; ovules attached laterally at or near the base, erect, anatropous; fruiting-calyx herbaceous, mostly ventricose, eventually split, often connivent or contorted at the apex, thin-textured; fruit mostly enclosed by the mature calyx, schizocarpous, with the pericarp hard and dry, readily separating at maturity into 4 one-seeded linear or linear-oblong (rarely elliptic-winged) crustaceous cocci (nutlets); seeds 4, erect, oblong, triangular in cross-section, without or with negligible endosperm, the outer face convex; cotyledons 2, thick, applicate.

Best known to the layman of all the genera of Verbenaceae is the type genus, Verbena, founded by Linnaeus in the first edition of his Systema Naturae in 1737, but with a pre-Linnean history that goes back to the classical days of the ancient Greeks and Romans. In this historic genus over 500 binomials have been published by botanical workers through the years, but a great many of the plants thus referred to do not belong in the true genus Verbena as now recognized. True verbenas are most abundant in the central and south-central portions of the United States, in Mexico, and in southern Brazil, Paraguay, Uruguay, Argentina, and Chile where over 205 species and varieties are concentrated. In the Old World (Europe, Asia, Africa, and Australia) there are only about 5 native species and varieties and 8 or 9 additional ones introduced from America as weeds. Because of the showy flowers of so many of its species, the genus (especially the subgenus Glandularia, which is perhaps worthy of generic rank) has long been an important horticultural subject.

The genus is a complex one of about 355 species, subspecific taxa, and hybrids native to temperate and tropical America; 2 species native to the Mediterranean region and the Near East and introduced elsewhere in the Old World. There are several widely cultivated forms. Several American species have become naturalized in various parts of Europe, Asia, Africa, and Australia. The type species is V. officinalis L.

The generic name "vervain" is a Middle English word and "verveine" an Old French adaptation derived from the Celtic, fer, to take away, and faen, stone, in allusion to the former use of the type species in the treatment of bladder-stones, while "Verbena" appears to be the ancient Latin adaptation of this, used by Virgil and Pliny and later adopted by Linnaeus. I. Acuña (1945) gives the etymology as "lat. herbena — una hierba verde, derivado de herbeo-verdear." Rümpler (1873) gives the common names "Eisenkraut" and "Verbene" in German, and says as to the origin of the generic name "Soll von dem keltischen ferfaen abstammen und aus fer, wegführen, und faen, Stein, zusammengesetzt sein; das Kraut wurde nämlich gegen Blasenstein angewendet. Wahrscheinlich aber ist die Abstammung von dem lateinischen verbum, Wort, weil man bei diesem Kraute schwor und es auch bei Opfern gebrauchte."

At least 100 of the taxa here accepted are known from cultivation. Judging from these, apparently all the verbenas are readily raised from seed in early spring in heat, or from cuttings of shoots which have no flowers. The hardy perennial species may also be raised by division of the rootstocks. All require a rich soil and may be planted in the open border during summer from the middle or end of May in the Northern Hemisphere. Most of the species are somewhat tender, even V. rigida being apt to suffer in hard winters. V. hybrida was at one time commonly propagated by cuttings to keep the various named color forms true, but the plants were found to be difficult to keep through the winter.

Members of this genus apparently hybridize quite readily. Numerous natural hybrids have already been discovered and named; others are suspected. Artificial hybrids have also been produced by experimental workers. A list of the known hybrids follows:

xVerbena adulterina Hausskn. = V. officinalis L. x V. supina L.

xVerbena argentina Moldenke = V. cabrerae Moldenke x V. callian-
tha Briq.

xVerbena baileyana Moldenke = V. hastata L. x V. officinalis L.

xVerbena bealei Moldenke = V. hispida Ruíz & Pav. x V. litoralis
H.B.K.

xVerbena bingenensis Moldenke = V. bracteata Lag. & Rodr. x V.
lasiostachys var. septentrionalis Moldenke

xVerbena blanchardi Moldenke = V. hastata L. x V. simplex Lehm.

xVerbena clemensorum Moldenke = V. officinalis L. x V. robusta
Greene

xVerbena conata Moldenke = V. officinalis L. x V. halei Small

xVerbena corrupta Moldenke = V. peruviana (L.) Britton x V. phlog-
iflora Cham.

xVerbena covasii Moldenke = V. santiaguensis (Covas & Schnack)
Moldenke x V. temuisecta Briq.

xVerbena deamii Moldenke = V. bracteata Lag. & Rodr. x V. stricta
Vent.

xVerbena dermeni Moldenke = V. bonariensis L. x V. hispida Ruíz &
Pav.

xVerbena dissoluta Moldenke = V. phlogiflora Cham. x V. temuisecta
Briq.

xVerbena engelmannii Moldenke = V. hastata L. x V. urticifolia L.

xVerbena fabricata Moldenke = V. hispida Ruíz & Pav. x V. urtici-
folia L.

xVerbena fecunda Moldenke = V. ambrosifolia f. eglandulosa Perry x
V. canadensis (L.) Britton

xVerbena ferax Moldenke = V. canadensis (L.) Britton x V. racemosa
Eggert

xVerbena goodmani Moldenke = V. halei Small x V. stricta Vent.

xVerbena hybrida Voss = V. incisa Hook. x V. peruviana (L.) Britton
x V. phlogiflora Cham. x V. platensis Spreng.

xVerbena illicita Moldenke = V. stricta Vent. x V. urticifolia L.
xVerbena inhonesta Moldenke = V. lasiostachys Link x V. urticifolia L.
xVerbena intercedens Briq. = V. bonariensis L. x V. ovata Cham.
xVerbena kondai Moldenke = V. racemosa Eggert x V. temisecta Briq.
xVerbena lecocqi Moldenke = V. hispida Ruíz & Pav. x V. lasiostachys Link
xVerbena matritensis Moldenke = V. carolina L. x V. hastata L.
xVerbena meretrix Moldenke = V. hispida Ruíz & Pav. x V. officinalis L.
xVerbena moechina Moldenke = V. simplex Lehm. x V. stricta Vent.
xVerbena nequam Moldenke = V. dissecta Willd. x V. tenuisecta Briq.
xVerbena noacki Moldenke = V. hastata L. x V. hispida Ruíz & Pav.
xVerbena notha Moldenke = V. halei Small x V. neomexicana (A. Gray) Small
xVerbena oklahomensis Moldenke = V. bipinnatifida Nutt. x V. canadensis (L.) Britton
xVerbena osteni Moldenke = V. peruviana (L.) Britton x V. platensis Spreng.
xVerbena perriana Moldenke = V. bracteata Lag. & Rodr. x V. urticifolia L.
xVerbena prostibula Moldenke = V. hispida Ruíz & Pav. x V. simplex Lehm.
xVerbena rydbergii Moldenke = V. hastata L. x V. stricta Vent.
xVerbena schnackii Moldenke = V. megapotamica Spreng. x V. peruviana (L.) Britton
xVerbena scorta Moldenke = V. halei Small x V. lasiostachys Link
xVerbena solbrigii Moldenke = V. peruviana (L.) Britton x V. tenuisecta Briq.
xVerbena suksdorfi Moldenke = V. lasiostachys var. septentrionalis Moldenke x V. officinalis L.
xVerbena teasii Moldenke = V. hybrida Voss x V. temisecta Briq.
xVerbena torpa Moldenke = V. neomexicana (A. Gray) Small x V. urticifolia L.
xVerbena transitoria Moldenke = V. megapotamica Spreng. x V. tenuisecta Briq.
xVerbena trinitensis Moldenke = V. incisa Hook. x V. temisecta Briq.
xVerbena uruguayensis Moldenke = V. peruviana (L.) Britton x V. tenera Spreng.
xVerbena vaga Moldenke = V. megapotamica Spreng. x V. santiaguensis (Covas & Schnack) Moldenke
xVerbena wingei Moldenke = V. canadensis (L.) Britton x V. temui-

secta Briq.

An intergeneric interfamily hybrid has also been described and illustrated, xVeronicena haartmani Moldenke, said by Haartman, Plantae hybridae 7--8 (1751) and Amoen. Acad. 3: 35, pl. 2 (1756), to be a hybrid between V. officinalis L. and the scrophulariaceous Veronica maritima L. The status of this plant, however, is highly questionable, as has been pointed out by me in Am. Midl. Nat. 59: 363--364 (1958). Its existence seems to have been rather generally ignored by, or unknown to, later workers. I have not as yet seen the type -- if, indeed, any such was ever preserved -- but among the 171,938 herbarium specimens of my groups that have passed through my hands in the past 32 years there were two specimens which may possibly have represented this same or a similar taxon. Unfortunately, not being aware myself at that time of Haartman's paper, I returned the specimens to their respective institutional owners with the simple annotation "Not verbenaceous!" and kept no detailed record of them. My recollection of them, however, is that they represented a plant much like the one figured by Haartman. The sheets on which they were mounted -- as I recall them now -- were both quite old and had apparently been bandied about from one genus and family to another, always to be returned to the harbarium owning them with the comment that they did not pertain to that group. I recall "Scroph.?", "Labiat.?", and even "Lobeliac.?" inscribed on at least one of them, with each suggestion later stricken out by pencil. Perhaps the curators of the herbaria in question, on reading this, may recall the specimens and may re-examine them in the light of Haartman's claims. Unfortunately, having studied material of my groups from 260 herbaria, I cannot now recall to which herbaria they were returned.

As far as I am aware, this claim of Haartman is the first for a hybrid between species belonging to entirely different families of either plants or animals. Generally such an inter-family hybrid is regarded as biologically impossible, and this alone tends to cast much doubt on Haartman's claim. It is very possible that his concept of a "hybrid" plant was quite different from our modern concept. A detailed study of the remainder of his paper may throw considerable light on his thinking. In Am. Midl. Nat. 59: 364 (1958) are given the detailed similarities and differences between Verbena and Veronica as genera, and the Verbenaceae and Scrophulariaceae which they represent. The chromosome complements of both supposed parents are also compared.

Cabrera, Covas, Dawson, Gmelin, Mattfeld, Nuttall, Ragonese, Schnack, Rozier, Small, and Solbrig have all suggested the segregation of the genus Glandularia J. F. Gmel. from Verbena. Personally, I think that this is quite justified, but because of the great number of nomenclatorial changes which this would necessitate in widely known species, including cultivated ones, I have not followed this course in the present work. Schnack & Covas, in Bol. Soc. Argent. Bot. 1: 282--284 (1946), summarize the situation as follows: "El estudio de numerosas especies incluídas en el género Verbena (sensu Schauer, en D. C., Prodr., 11: 550, 1847) nos ha permitido

confirmar el carácter artificial de esta entidad, y correspondientemente la validez del género Glandularia, recientemente rehabilitado.....y que comprende una serie de antiguas Verbenas. En efecto, hemos podido establecer la concomitancia de una serie de caracteres de la más distinta naturaleza dentro del género Glandularia, por una parte, y del género Verbena (en su sentido actual restringido) por otra. Así, la naturaleza de la banda clorofiliana cortical, la longitud del estilo en relación al ovario, la forma de las anteras, de la corola y de los mericarpios, entre otros caracteres, guardan una correlación tan estrecha entre las especies de Glandularia, y son tan netamente antagónicos con respecto a los caracteres de las especies de Verbena, que no vacilamos en calificar a estos dos géneros como dos entidades perfectamente distintas y naturales, en las que fenómenos de convergencia de formas conducen a una similitud aparente de especies que pertenecen a dos líneas evolutivas distintas."

They summarize the differences as follows: in Verbena (1) the stems are plainly quadrangular, (2) the chlorophyllous cortical parenchyma is discontinuous (interrupted at the angles), (3) the inflorescence is paniculate, many-spicate, (4) the corolla is funnel-form, (5) the thecae of the anthers do not surpass the connective, (6) the style becomes approximately 3 times as long as the ovary, (7) the mericarps are chestnut-reddish in color, with the pericarp not prolonged either laterally or at the base of the embryonal sector, and (8) the chromosomes are x = 7 and small. In Glandularia, on the other hand, (1) the stems are cylindric-quadrangular, (2) the chlorophyllous cortical parenchyma is continuous, (3) the inflorescence is few-spicate, generally 1—3-spicate, (4) the corolla is salver-form, (5) the anther-thecae surpass the connective, (6) the style is variously longer than the ovary, (7) the mericarps are brown-blackish, with the pericarp dilated laterally or rather prolonged beneath the embryonal sector, forming an excavated base, and (8) the chromosomes are x = 5 and comparatively larger. Mattfeld (1951) says: "Die bisher mit Verbena (x = 7) vereinigte Gattung Glandularia Gm. (x = 5).....musz als eigene Gattung abgetrennt werden." Meisner and Walpers used the generic name Shuttleworthia and Bunge proposed Uwarowia for what is essentially this group.

In this connection it is interesting to note that cytologists have reported the following chromosome numbers for species of Verbena (sens. lat., including Glandularia): n = 5, 2n = 10 — V. dissecta, V. erinoides [probably tenuisecta], V. erinoides var. alba [probably tenuisecta var. alba], V. flava, V. grandiflora [probably canadensis], V. hybrida, V. laciniata, V. mendocina, V. microphylla, V. parodii, V. perakii, V. peruviana, V. phlogiflora, V. platensis, V. radicans, V. santiaguensis, V. tenera, V. tenuisecta, and V. teucrioides [=platensis]; n = 10, 2n = 20 — V. crithmifolia, V. hookeriana, V. pumila, V. quadrangulata, V. racemosa, and V. wrightii; n = 15, 2n = 30 — V. ambrosifolia, V.

ambrosifolia f. eglandulosa, V. bipinnatifida, V. cameronensis, V. canadensis var. atroviolacea, V. canadensis var. compacta, V. canadensis, V. ciliata, V. delticola, V. elegans var. asperata, V. gooddingii var. nepetifolia, V. racemosa, and V. teucriifolia; n = 7, 2n = 14 — V. canescens var. roemeriana, V. carolina, V. cloverae, V. halei, V. hastata, V. hispida, V. macdougalii, V. neomexicana, V. neomexicana var. hirtella, V. officinalis, V. perennis, V. plicata, V. prostrata [=lasiostachys], V. simplex, V. stricta, and V. urticifolia; n = 14, 2n = 28 — V. bonariensis, V. brasiliensis, V. ehrenbergiana, and V. litoralis; n = 21, 2n = 42 — V. integrifolia, V. rigida, V. xutha. It is to be noted that workers have obtained different chromosome numbers for V. canadensis and for V. racemosa, perhaps due to misidentification of the material used.

Walpers (1845) classified the genus Verbena as follows:

Sect. 1. Aloysioides Walp.
Sect. 2. Verbenaca Walp.
§ 1. Spinosae Walp.
A. Seriphioideae Walp.
B. Erinaceae Walp.
§ 2. Inermes Walp.
* Folia fasciculata
A. Selaginoideae Walp.
B. Thymoideae Walp.
** Folia opposita non fasciculata
A. Junceae Walp.
B. Foliosae Walp.
1. Micranthae Walp.
α. Holophyllae Walp.
β. Schizophyllae Walp.
2. Macranthae Walp.
α. Melindres Walp.
β. Aubletia (Neck.) Walp.

In this classification his Section 1 is synonymous with the genus Aloysia Ortega; his Spinosae, Seriphioideae, Erinaceae, and Selaginoideae are all congeneric with Junellia Moldenke; his Junceae contains 2 species of Diostea, 2 of Junellia, and 1 Neosparton, as well as 3 true species of Verbena.

Schauer (1847) divided the genus as follows:

Sect. 1. Verbenaca Walp.
Subsect. 1. Pungentes Schau.
Subsect. 2. Nobiles Schau.
Subsect. 3. Pachystachyae Schau.
Subsect. 4. Verticilliflorae Schau.
Subsect. 5. Leptostachyae Schau.
Sect. 2. Glandularia (J. F. Gmel.) Schau.

In this classification his Section Pungentes is now a part of the genus Junellia, while his Section Verticilliflorae is divided among Diostea Miers, Junellia Moldenke, and Neosparton Griseb.

In the system adopted by myself in 1959 and later emended, the genera and subgeneric groups of the Tribe Euverbeneae are distinguished as follows:

1. Calyx more or less tubular; fruit dry, included by the fruiting-calyx, usually separating into 4 cocci when ripe.
2. Fruiting-calyx unchanged, not accrescent; stamens 4.
3. Woody shrubs or subshrubs of desert and high-alpine regions; leaves usually greatly reduced; inflorescence reduced.
4. Calyx deeply 5-parted almost to the base, with long filiform lobes, densely long-villous; stigma obliquely capitate, apiculate; leaves densely imbricate; Chile. Genus Urbania R. A. Phil.

4a. Calyx mostly only 5-toothed, with short, often obscure teeth, rarely long-toothed, usually not long-villous; leaves not usually closely imbricate; Argentina, Chile, Bolivia, and Peru. Genus Junellia Moldenke.

5. Leaves alternate, simple, fascicled. Group Selaginoideae Walp.

5a. Leaves opposite.

6. Flowers in small dense heads; leaves parted or entire, more or less stiff and thorny. Series Acerosae Briq.

7. Spines distinct from the foliage. Group Seriphioideae Walp.

7a. Leaves and bracts spinescent. Group Erinaceae Walp.

6a. Flowers in 1- or 2, rarely few-flowered clusters at the tips of the branches; low, often tufted or sod-like, high-alpine plants with tangled branches. Series Pungentes Schau.

3a. Herbaceous plants or subshrubs, not limited to desert or high-alpine regions; leaves and inflorescences usually well developed.

8. Fruit not beaked, composed of 4 cocci, easily separable when ripe. Genus Verbena L.

9. Anthers unappendaged. Subgenus Verbenaca (Walp.) Lewis.

10. Plants often subshrubby, usually with greatly reduced or even scale-like leaves. Series Junceae Walp.

10a. Plants mostly herbaceous; foliage mostly not reduced. Series Foliosae Walp.

11. Young spikes fastigiate-capitate, Subseries Macranthae Walp.

12. Leaves crenate, dentate, or subincised. Group Melindres Walp.

12a. Leaves incised-lobed, pinnatifid, or bipinnatifid. Group Aubletia (Neck.) Walp.

11a. Young spikes not fastigiate-capitate; corollas mostly small and individually not showy; calyx rare-

ly twice as long as the fruit, not contorted beyond it. Subseries Micranthae Walp.

13. Spikes abbreviated, the flowers crowded. Group Pachystachyae Schau.

13a. Spikes elongated, filiform, the flowers scattered. Group Leptostachyae Schau.

9a. Some anther-connectives usually appendaged; corolla mostly large and showy; calyx usually more than twice as long as the fruit and constricted or contorted beyond it. Subgenus Glandularia (J. F. Gmel.) Lewis.

8a. Fruit beaked, nutlet-like, not readily separating. Genus Stylodon Raf.

2a. Fruiting-calyx accrescent, broadened and inflated at the base; stamens 2. Genus Hierobotana Briq.

1a. Fruiting-calyx broadly campanulate; fruit a 4-celled drupe, with more or less fleshy exocarp and hard endocarp. Genus Ghinia Schreb.

It is worth noting here that Verbena Dill. is a synonym of Priva Adans. and that Verbena Pluk. is synonymous with Stachytarpheta Vahl. The genus Verbena L. was placed in Family 75, Labiatae, Section Verbeneae, by Heinrich Gottlieb Ludwig Reichenbach in Mössler, Handb. Gewächsk., ed. 1, 1: xxxvi (1827) and ed. 3, 1: lxxv (1833), and also by him in his Conspectus Regni Vegetabilis per Gradus Naturalis Evoluti 1: 117 (1828).

Kuhlmann & Kühn, Flor. Dist. Ibiti 182 (1947) say "Verbena spp. — As herbas agrupadas neste genero aparecem geralmente em terrenos baldios, cultivados e nos quintais. A 'camaradinha' ou 'jurujba' é cultivada nos jardins. Produzem flores de colorido variável conforme a espécie ou variedade, também visitadas por Lepidópteros e 'Abelhas'. Os frutos sao secos, nada demunciando de apreciável nas suas relacoes com a Fauna."

Rehder (1949) includes in the synonymy of Verbena the following genera: Burseria Löfl. [actually a synonym of Priva Adans.], Stylodon Raf., Styleurodon Raf. [a synonym of Stylodon], and Junellia Moldenke.

Martin (1946) examined 14 species and reports that the endosperm is "negligible". Junell (1934) discusses the gynoecium morphology. Schauer (1847) says that there are only 2 stamens in one species of the genus (!) and that the ovary is very rarely 6-celled. Schauer, of course, included in the genus what we now separate as Hierobotana, Junellia, and Stylodon. The Gmelin reference cited by me in the bibliography (on previous pages) is often cited by other authors as "Gmelin, Syst. Veg. 920. 1791". The genus Billardiera is sometimes cited to "Moench, Meth. 366. 1794", but "369" is the correct page citation. Verbena is sometimes cited to "L., Syst. Veg., ed. 1. 1737", but I have thus far been unable to trace this reference.

Lewis & Oliver (1961) give a very interesting discussion of the genus under V. ovata Cham.: "This species, found in east-central

South America, might have arisen as an amphidiploid in a cross between an n = 5 and n = 7 species followed by genomic doubling to reach this polyploid level. Dermen's (1936) inability to produce an intersectional hybrid, the rare occurrence of 1 parent in South America, and the unquestioned classification of V. ovata in the section Verbenaca (the taxon is not morphologically intermediate) are all evidences against such an origin. Alternately, V. ovata may be a terminal dodecaploid of an extant x = 6 series which was morphologically more closely related to Verbenaca than to Glandularia. Additional cytological studies might reveal other 'relic' taxa in South America, but the very existence of V. ovata supports the hypothesis of an ancestral x = 6 stock. Since many modern angiosperm genera were differentiated in the Cretaceous, we assume conservatively that the x = 6 prototype was widespread in the tropical environment and lowlands characteristic of this period. With the elevation of the Cordilleras during the Lamaride Revolution, the phylad was reduced considerably in distribution. The opening of the new colder and drier environments adjacent to the tropics in the late Cretaceous and Plaeocene gave the necessary stage for the evolution of new taxa. On the northern boundaries of the phylad's now limited range, the ascending x = 7 aneuploid series originated, perhaps during the (early) Tertiary. This macroevolution gave rise to the now dominant Verbenaca in North America. Similarly, the x = 5 descending aneuploid series in South America was evolved (section Glandularia) and became adapted to the more temperate environment in that continent. By the Miocene these phylads were well-established and diverse in the warm temperate regions of both continents adjacent to the tropical zone. With the restriction of the tropical zone during the Tertiary and particularly from the Miocene to recent times, a great numerical decrease in the ancestral population could be expected. Together with the new competitive factors manifested by these conditions, a general decline in the whole taxon was probably the result. Indefinite multiplication of chromosome numbers could not but have a deleterious effect upon the group (Levan, 1942), and if the high level of polyploidy reached by V. ovata is an example, this factor also may have contributed to the near extinction of the x = 6 phylad. The final result is an amphitropical distribution for Verbena.

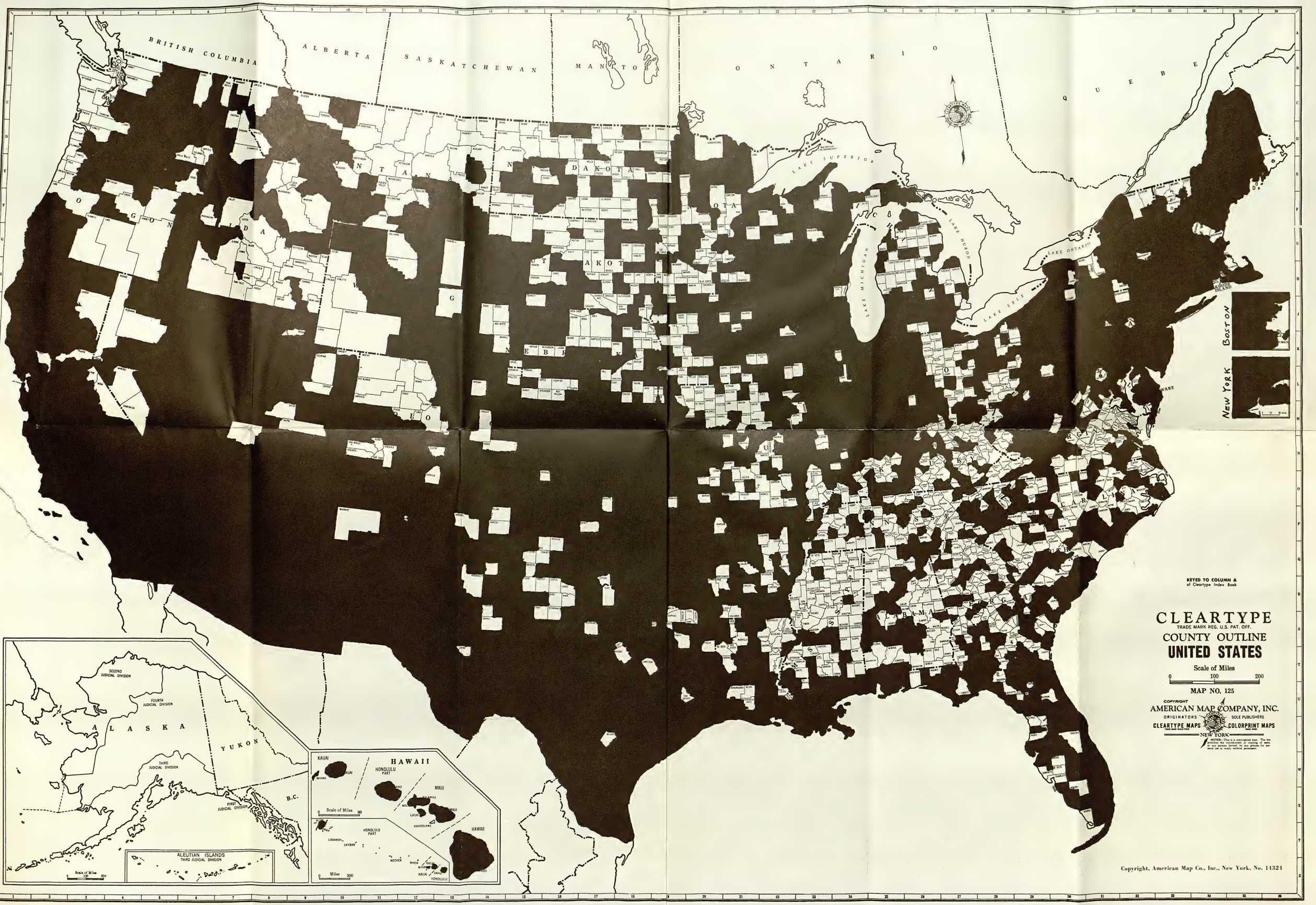
"The question of both Verbena sections occurring in North and South America remains to be answered. Migration of diploid or tetraploid Glandularia, from South America via trans-tropical land-bridges, similar to the distribution of V. litoralis, or by long-range dispersal, are plausible explanations. Probably this migration took place during the later Miocene or Pliocene in a period of maximum extension of the upland temperate regions into the tropical forests. Once established and after becoming disjunct, this new population(s) could have given rise to the Glandularia taxa in North America. Very likely a migration southward of one or more North American Verbenaca also occurred during

these periods and formed the basis for the high level of polyploidy in South America currently unknown to the north. These species, new to both continents, successfully competed with the taxa already present, and polyploidy as an evolutionary mechanism had a selective advantage over the widespread (diploid) populations."

Vernacular names for the genus as a whole are "aublétia", "aublétie", "camaradinha", "camaradinhas", "cambarás", "cedrón", "chichiantic", "Eisen-hart", "Eisen-hort", "Eisen-klette", "Eisenkraut", "Eisenweich", "herva cidreira", "holy herb", "ijzerhard", "iron-weed", "jujubas", "jujubes", "jurujba", "margarita colorada", "margarita punzó", "moradilla", "salvia montés", "Shah's favourite", "Sha-passan", "tepe-chian", "tlalahuehuetl", "verbena", "verbenas", "vervain", "vervains", "verveine", "vervène", "verveyne", "wijkruid", and "yapau". Actually, some of these names obviously apply only to the species which happen to grow in a certain circumscribed area, which, in a few cases, may actually be only a single species; yet authors give these names as generic designations. It is worth noting here that "false verbena" is Cochranea anchusaefolia (Poir.) Gürke in the Heliotropiaceae and "sand-verbena" is the genus Abronia Juss. in the Nyctaginaceae, while the name "verbena" is often applied also to Bouchea prismatica (L.) Kuntze, B. prismatica var. longirostra Grenz., Clerodendrum fragrans var. pleniflorum Schau., Priva lappulacea (L.) Pers., Stachytarpheta cayennensis (L. C. Rich.) Vahl, S. calderonii Moldenke, S. frantzii Polak., S. jamaicensis (L.) Vahl, and S. guatemalensis Moldenke, as well as to Salvia polystachya Ort. in the Lamiaceae; "verbena celeste" is Stachytarpheta frantzii, "verbena de playa" is S. jamaicensis, "verbena manza" is S. jamaicensis and Bouchea prismatica var. longirostra, "verbena cimarrona" is Bouchea prismatica, "verbena de flos grande" is Bouchea rusbyi Moldenke, and "verbena morada" is Stachytarpheta frantzii. "Verveine" is also applied to Phyla nodiflora (L.) Greene and to Stachytarpheta jamaicensis, "verveine queue de rat" is S. jamaicensis, "verveine à fleurs rouges" is S. mutabilis (Jacq.) Vahl, "verveine à trois feuilles" is Aloysia triphylla (L'Hér.) Britton, "verveine bleue" and "verveine queue de rat" are also S. indica (L.) Vahl, "verveine citronelle", "verveine odorante", "verveine du Pérou" are Aloysia triphylla, "verveine du Mexique" is Priva mexicana (L.) Pers,, "verveine du pays" and "verveine sauvage" are Phyla nodiflora, "verveine faux-gervaô" is Bouchea fluminensis (Vell.) Moldenke, "verveine caraibe" is Wedelia carnosa Rich. in the Carduaceae, and "verveine puante" is Petiveria alliacea L. in the Petiveriaceae. According to Augusto d'Halmar's "San Miguel y las Verbenas madrileñas", there are some fiesta dances in Spanish-speaking countries known as "verbena". In Chilton County, Alabama, there is a town and post office named "Verbena".

Figure 1. Distribution of Verbena in the United States

Mapping by county done by Andrew R. Moldenke



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The maps appearing in this monograph are designed to show at a glance the known distribution of the genus and its constituent species in the United States of America, based on the specimens thus far examined by me. I am deeply grateful to my son, Andrew Ralph Moldenke, for the hundreds of hours of his time which he sacrificed from his entomologic studies in order to prepare these maps for this work. No attempt has been made to indicate the relative abundance of records from a given county -- there may be only one or there may be many -- nor the exact location of the records within the county or parish. A county or parish (or island) is blackened on the map to indicate that we have a record or records of the taxon's occurrence in the wild state there and it may be expected and looked for there by students of the group. Figure 1 indicates the distribution of the genus as a whole in this country. Counties where more intensive collecting is required are plainly shown on this map, since it is hardly likely that the genus does not occur in counties completely surrounded by counties from which we have records of its presence. Students living in or near these counties are urged to search in them for specimens of this genus and communicate them to me so that we may eventually fill in the empty spaces in a future edition of this map and the maps that follow.

In the Linnean Herbarium at London the specimen number "1" under genus 35, Verbena, is Stachytarpheta indica; number "2" is S. jamaicensis -- and they are very different from each other! Number "3" is labeled "prismatica" in the handwriting of Solander and bears the annotation "Br." [=Browne; Patrick Browne's herbarium was purchased for Linnaeus in 1758] and another notation in the handwriting of Smith "Stachytarpheta prismatica Sm. in R. Cycl. No. 11." It is actually Bouchea prismatica (L.) Kuntze, with the beaks of the cocci 1.5—2.5 mm. long. Number "4" is labeled "mexicana" in Linnaeus' handwriting and is Priva mexicana (L.) Pers. Number "5" is labeled "lappulacea" in the handwriting of Solander and bears the notation "Br." It is Priva lappulacea (L.) Pers. Number "6", pinned to number "5", is labeled "lappulacea" in Linnaeus' own handwriting and bears the notation "Br." [=Browne] and "Rolander" [Rolander collected in Surinam after 1754]; it is Salvia occidentalis Sw. Number "7" is labeled "stoechadifolia" in the handwriting of Solander, and is Phyla stoechadifolia (L.) Small. Number "8" is labeled "nodiflora" in the handwriting of Solander, and is Phyla nodiflora (L.) Greene. There are more specimens following of this and other species. On specimen number "1" under genus 755, Phryma, Linnaeus wrote "Leptostachya" on the bottom in his usual handwriting and manner, and "Verbena" on top in a large script [the handwriting verified by Mr. Savage, of the Linnean Society, in each case]. On the reverse side of sheet number "3" there is a description in Linnaeus' own handwriting [verified by Savage] starting out "Verbena. Cal. 1-phyllus cylindricus, etc." The specimen was named "hians" on the front of the sheet by Linnaeus (never published

under Phryma until by B. D. Jackson in his Index of the Linnean Herbarium) and is actually Chascanum dehiscens (L. f.) Moldenke. The specimens in his herbarium that are true Verbena species will be discussed hereinafter under the taxa involved.

Following is an alphabetic list of names applying to species and varieties excluded from the genus:

Verbena alatocarpa Troncoso = Junellia alatocarpa (Troncoso) Moldenke

Verbena alpigena Walp. = Aloysia scorodonioides (H.B.K.) Cham.

Verbena alternifolia Herb. = Junellia selaginoides (Kunth) Moldenke

Verbena alternifolia Hort. = Junellia selaginoides (Kunth) Moldenke

Verbena alternifolia Sessé & Moc. = Stachytarpheta incana var. angustibracteata Moldenke

Verbena ameghinoi Speg. = Junellia ameghinoi (Speg.) Moldenke

Verbena americana Mill. = Stachytarpheta jamaicensis (L.) Vahl

Verbena americana flore coccinea spicato Breyn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena angustifolia Mill. = Stachytarpheta angustifolia (Mill.) Vahl

Verbena aphylla Gill. = Neosparton aphyllum (Gill. & Hook.) Kuntze

Verbena aphylla Gill. & Hook. = Neosparton aphyllum (Gill. & Hook.) Kuntze

Verbena arborea H.B.K. = Petrea arborea H.B.K.

Verbena arborescens Bojer = Lippia javanica (Burm. f.) Spreng.

Verbena aretioides R. E. Fries = Junellia aretioides (R. E. Fries) Moldenke

Verbena aretioides Hayek = Junellia hayekii Moldenke

Verbena aretoides Hayek = Junellia hayekii Moldenke

Verbena aristata Vahl = Stachytarpheta orubica (L.) Vahl

Verbena asparagoides Gill. = Junellia asparagoides (Gill. & Hook.) Moldenke

Verbena asparagoides Gill. & Hook. = Junellia asparagoides (Gill. & Hook.) Moldenke

Verbena asparagoides var. famatinensis Hieron. = Junellia asparagoides (Gill. & Hook.) Moldenke

Verbena aspera Gill. & Hook. = Junellia aspera (Gill. & Hook.) Moldenke

Verbena aspera Hügel = Priva cordifolia (L. f.) Druce

Verbena azorelloides Speg. = Junellia azorelloides (Speg.) Moldenke

Verbena bifurca Benth. = Bouchea prismatica (L.) Kuntze

Verbena bisulcata Hayek = Junellia bisulcata (Hayek) Moldenke

Verbena bonariensis Rendle = Junellia patagonica (Speg.) Moldenke

Verbena briquetii Macbr. = Junellia seriphioides (Gill. & Hook.)

Moldenke
Verbena bryoides Echeg. = Junellia asparagoides (Gill. & Hook.) Moldenke
Verbena bryoides R. A. Phil. = Junellia bryoides (R. A. Phil.) Moldenke
Verbena caespitosa Gill. & Hook. = Junellia caespitosa (Gill. & Hook.) Moldenke
Verbena cajanensis L. C. Rich. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena cajenensis Rich. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena callicarpiaefolia Kunth = Lippia callicarpaefolia H.B.K.
Verbena cannabifolia Sieb. & Zucc. = Vitex negundo var. cannabifolia (Sieb. & Zucc.) Hand.-Mazz.
Verbena capensis Thunb. = Lippia javanica (Burm. f.) Spreng.
Verbena capensis f. capillaris Ray = Hebenstretia erinoides L. f., Selaginaceae
Verbena capitata Blanco = Phyla nodiflora (L.) Greene
Verbena capitata Forsk. = Phyla nodiflora (L.) Greene
Verbena capitata Hort. = Lippia javanica (Burm. f.) Spreng.
Verbena carnea Medic. = Stylodon carneus (Medic.) Moldenke
Verbena carolinense (Walt.) Gmel. = Stylodon carneus (Medic.) Mold,
Verbena carolinensis Gmel. = Stylodon carneus (Medic.) Moldenke
Verbena carolinensis Small = Stylodon carneus (Medic.) Moldenke
Verbena carolinensis Walt. = Stylodon carneus (Medic.) Moldenke
Verbena carolinensis (Walt.) J. F. Gmel. = Stylodon carneus (Medic.) Moldenke
Verbena carolinensis (Walt.) Small = Stylodon carneus (Medic.) Moldenke
Verbena caroliniana Hort. = Stylodon carneus (Medic.) Moldenke
Verbena caroliniana L. [ex Raf.] = Stylodon carneus (Medic.) Moldenke
Verbena caroliniana Medic. = Stylodon carneus (Medic.) Moldenke
Verbena caroliniana Michx. = Stylodon carneus (Medic.) Moldenke
Verbena caroliniana (Walt.) Michx. = Stylodon carneus (Medic.) Moldenke
Verbena caroliniarum L. = Stylodon carneus (Medic.) Moldenke
Verbena caroliniensis (Walt.) J. F. Gmel. = Stylodon carneus (Medic.) Moldenke
Verbena carroo Speg. = Junellia tridens (Lag.) Moldenke
Verbena carróo Speg. = Junellia tridens (Lag.) Moldenke
Verbena castrata Sessé & Moc. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena caudata Salisb. = Stachytarpheta indica (L.) Vahl
Verbena cayannensis Rich. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena cayennensis L. C. Rich. = Stachytarpheta cayennensis (L.

C. Rich.) Vahl
Verbena cedroides Sandw. = Junellia cedroides (Sandw.) Moldenke
Verbena ceratophylla Bonpl. = Hierobotana inflata (H.B.K.) Briq.
Verbena chubutensis Speg. = Junellia wilczekii (Briq.) Moldenke
Verbena cinerascens Schau. = Diostea cinerascens (Schau.) Moldenke
Verbena citriodora Cav. = Aloysia triphylla (L'Hér.) Britton
Verbena citriodora Ort. = Aloysia triphylla (L'Hér.) Britton
Verbena clerodendron Froes = Clerodendrum calamitosum L.
Verbena colchaguensis R. A. Phil. = Junellia lavandulaefolia var. colchaguensis (R. A. Phil.) Moldenke
Verbena comberi Sandw. = Junellia comberi (Sandw.) Moldenke
Verbena connatibracteata Kuntze = Junellia connatibracteata (Kuntze) Moldenke
Verbena connatibracteata f. glomerata Monticelli = Junellia connatibracteata f. glomerata (Monticelli) Moldenke
Verbena connatibracteata f. normalis Monticelli = Junellia connatibracteata (Kuntze) Moldenke
Verbena connatibracteata f. rosulata Monticelli = Junellia connatibracteata f. rosulata (Monticelli) Moldenke
Verbena cordata Hort. = Aloysia chamaedryfolia Cham.
Verbena cordata Mackay = Aloysia chamaedryfolia Cham.
Verbena cordifolia Bourgeau = Priva mexicana (L.) Pers.
Verbena cuneata Willd. = Phyla nodiflora (L.) Greene
Verbena curassavica L. = Ghinia curassavica (L.) Millsp.
Verbena decurrens Moench = Stachytarpheta jamaicensis (L.) Vahl
Verbena dentada Vivian. = Aloysia chamaedryfolia Cham.
Verbena dentata Hort. = Aloysia chamaedryfolia Cham.
Verbena dentata Juss. = Aloysia chamaedryfolia Cham.
Verbena dentata Visian. = Aloysia chamaedryfolia Cham.
Verbena diandra Sessé & Moc. = Bouchea prismatica var. brevirostra Grenz.
Verbena diandria Larrañ. = Bouchea prismatica var. brevirostra Grenz.
Verbena dichotoma Larrañ. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena dichotoma Ruíz & Pav. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena digitata R. A. Phil. = Junellia digitata (R. A. Phil.) Moldenke
Verbena disperma Duchassaing & Sagot = Stachytarpheta jamaicensis (L.) Vahl
Verbena diversifolia Kuntze = Junellia diversifolia (Kuntze) Moldenke
Verbena dolichothyrsa Sandw. = Junellia dolichothyrsa (Sandw.) Moldenke

Verbena echegarayi Hieron. = Junellia echegarayi (Hieron.) Moldenke

Verbena echegayari Hieron. = Junellia echegarayi (Hieron.) Moldenke

Verbena echinata R. A. Phil. = Junellia seriphioides (Gill. & Hook.) Moldenke

Verbena elliptica Willd. = Phyla nodiflora var. canescens (H.B.K.) Moldenke

Verbena ellipticifolia Stokes = Stachytarpheta indica (L.) Vahl

Verbena erinacea Gill. & Hook. = Junellia erinacea (Gill. & Hook.) Moldenke

Verbena etchegarayi Hieron. = Junellia echegarayi (Hieron.) Moldenke

Verbena fluminensis Vell. = Bouchea fluminensis (Vell.) Moldenke

Verbena foliis cordato-ovatis, floribus spicatis, calicibus inflatis, seminatis echinatis P. Browne = Priva lappulacea (L.) Pers.

Verbena foliis verticaliter ovatis, spicis globosis L. = Phyla nodiflora (L.) Greene

Verbena foliis verticaliter ovatis, spicis solitariis ovatis Royen = Phyla nodiflora (L.) Greene

Verbena forskaelaei Vahl = Priva cordifolia (L. f.) Druce

Verbena forskaelei Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskaelii Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskålaei Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskålei Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskalii Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskaolaei Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskaolii Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena forskhalei Vahl = Priva adhaerens (Forsk.) Chiov.

Verbena fragrans Salisb. = Aloysia triphylla (L'Hér.) Britton

Verbena fruticosa Sessé & Moc. = Stachytarpheta incana Moldenke

Verbena gayana Kuntze = Junellia glauca (Gill. & Hook.) Moldenke

Verbena glaberrima Gill. & Hook. = Dipyrena glaberrima (Gill. & Hook.) Hook.

Verbena glauca Gay = Junellia glauca (Gill. & Hook.) Moldenke

Verbena glauca Gill. & Hook. = Junellia glauca (Gill. & Hook.) Moldenke

Verbena glauca var. cisandina Niederlein = Junellia glauca var. cisandina (Niederlein) Moldenke

Verbena glauca β cisandina Niederlein = Junellia glauca var. cisandina (Niederlein) Moldenke

Verbena globifera L'Hér. = Lippia alba (Mill.) N. E. Br.

Verbena globiflora L'Hér. = Lippia alba (Mill.) N. E. Br.

Verbena globiflora Nocca = Phyla nodiflora var. reptans (H.B.K.) Moldenke

Verbena globulifera Auct. = Lippia alba (Mill.) N. E. Br.
Verbena globulifera Spreng. = Lippia alba (Mill.) N. E. Br.
Verbena globuliflora L'Hér. = Lippia alba (Mill.) N. E. Br.
Verbena grandiflora Ort. = Priva grandiflora (Ort.) Moldenke
Verbena gratissima Gill. & Hook. = Aloysia lycioides Cham.
Verbena hastata x stricta Ravenel = Stylodon carneus (Medic.) Moldenke
Verbena heteraphilla Willd. = Hierobotana inflata (H.B.K.) Briq.
Verbena heterophylla Willd. = Hierobotana inflata (H.B.K.) Briq.
Verbena hirta Grah. = Lantana hirta Grah.
Verbena hispida Sessé & Moc. = Priva lappulacea (L.) Pers.
Verbena hyderabadensis Rottl. = Svensonia hyderobadensis (Walp.) Moldenke
Verbena hyderobadensis Rottl. = Svensonia hyderobadensis (Walp.) Moldenke
Verbena hyderobadensis var. maysorensis H. Wight = Svensonia hyderobadensis (Walp.) Moldenke
Verbena hydrabadensis Rottl. = Svensonia hyderobadensis (Walp.) Moldenke
Verbena hystrix Briq. = Junellia seriphioides (Gill. & Hook.) Moldenke
Verbena hystrix R. A. Phil. = Junellia hystrix (R. A. Phil.) Moldenke
Verbena illapelina R. A. Phil. = Junellia illapelina (R. A. Phil.) Moldenke
Verbena imbricata Sessé & Moc. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena inconcinna Briq. = Junellia ligustrina (Lag.) Moldenke
Verbena indica Jacq. = Stachytarpheta angustifolia (Mill.) Vahl
Verbena indica L. = Stachytarpheta indica (L.) Vahl
Verbena indica lanuginosa fl. rubente Barthol. = Manulea rubra L. f., Scrophulariaceae
Verbena inflata Humb. & Kunth = Hierobotana inflata (H.B.K.) Briq.
Verbena inflata H.B.K. = Hierobotana inflata (H.B.K.) Briq.
Verbena inflata Kunth = Hierobotana inflata (H.B.K.) Briq.
Verbena integerrima Larrañ. = Aloysia lycioides Cham.
Verbena intricata Briq. = Junellia intricata (Briq.) Moldenke
Verbena jamaicensis L. = Stachytarpheta jamaicensis (L.) Vahl
Verbena jamaicensis Vahl = Stachytarpheta jamaicensis (L.) Vahl
Verbena jamaicensis Vell. = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Verbena jamaicensis var. campestris Griseb. = Stachytarpheta australis Moldenke
Verbena javanica Burm. f. = Lippia javanica (Burm. f.) Spreng.
Verbena juncea Gill. & Hook. = Diostea juncea (Gill. & Hook.) Miers

Verbena junciformis Phil. = Junellia pseudo-juncea (C. Gay) Moldenke ?
Verbena juniperina Gill. & Hook. = Junellia juniperina (Lag.) Moldenke
Verbena juniperina Lag. = Junellia juniperina (Lag.) Moldenke
Verbena juniperina var. campestris Griseb. = Junellia juniperina (Lag.) Moldenke
Verbena juniperina var. clarenii Kurtz = Junellia juniperina (Lag.) Moldenke
Verbena juniperina var. grisea I. M. Johnst. = Junellia juniperina var. grisea (I. M. Johnst.) Moldenke
Verbena laciniata Sessé & Moc. = Bouchea prismatica var. laciniata Grenz.
Verbena lacunosa Mart. = Stachytarpheta lacunosa Mart.
Verbena laevigata Sessé & Moc. = Bouchea prismatica var. laciniata Grenz.
Verbena lanata Willd. = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Verbena lancifolia Moench = Stachytarpheta indica (L.) Vahl
Verbena lancifolia Steud. = Stachytarpheta indica (L.) Vahl
Verbena lantanoides Willd. = Lippia alba (Mill.) N. E. Br.
Verbena lappacea Jacq. = Priva lappulacea (L.) Pers.
Verbena lappulacea Jacq. = Priva lappulacea (L.) Pers.
Verbena lappulacea L. = Priva lappulacea (L.) Pers.
Verbena lapulacea L. = Priva lappulacea (L.) Pers.
Verbena lapulacea Sessé & Moc. = Priva lappulacea (L.) Pers.
Verbena lapullacea L. = Priva lappulacea (L.) Pers.
Verbena lavandulaefolia R. A. Phil. = Junellia lavandulaefolia (R. A. Phil.) Moldenke
Verbena lavandulaefolia var. colchaguensis Reiche = Junellia lavandulaefolia var. colchaguensis (R. A. Phil.) Moldenke
Verbena lavandulifolia R. A. Phil. = Junellia lavandulaefolia (R. A. Phil.) Moldenke
Verbena lavandulifolia var. colchaguensis Reiche = Junellia lavandulaefolia var. colchaguensis (R. A. Phil.) Moldenke
Verbena leptostachys Mart. = Bouchea fluminensis (Vell.) Moldenke
Verbena ligustrina Lag. = Junellia ligustrina (Lag.) Moldenke
Verbena ligustrina Lay. = Junellia ligustrina (Lag.) Moldenke
Verbena lindleyana Walp. = Buddleia lindleyana Fortune, Loganiaceae
Verbena lobelioides Grah. = Castelia cuneato-ovata Cav.
Verbena lobelioides Hort. = Castelia cuneato-ovata Cav.
Verbena lorentzii Niederlein = Junellia ligustrina (Lag.) Moldenke
Verbena lorentzii Niederlein & Hieron. = Junellia ligustrina (Lag.) Moldenke

Verbena luppulacea L. = Priva lappulacea (L.) Pers.
Verbena lupulina Cham. = Lippia lupulina Cham.
Verbena lychnitis Mart. = Stachytarpheta lychnitis Mart.
Verbena maximiliani Mart. = Stachytarpheta lactea Schau.
Verbena maysorensis Wight = Svensonia hyderobadensis (Walp.) Moldenke
Verbena mexica Sessé & Moc. = Priva mexicana (L.) Pers.
Verbena mexicana L. = Priva mexicana (L.) Pers.
Verbena mexicana trachelii folio fructu aparines Dill. = Priva mexicana (L.) Pers.
Verbena micrantha R. A. Phil. = Junellia micrantha (R. A. Phil.) Moldenke
Verbena microphylla R. A. Phil. = Junellia minutifolia (R. A. Phil.) Moldenke
Verbena minima Meyen = Junellia minima (Meyen) Moldenke
Verbena minutifolia Lag. = Junellia minutifolia (R. A. Phil.) Moldenke
Verbena minutifolia R. A. Phil. = Junellia minutifolia (R. A. Phil.) Moldenke
Verbena morenonis Kuntze = Junellia patagonica (Speg.) Moldenke
Verbena mulinoides Speg. = Junellia mulinoides (Speg.) Moldenke
Verbena muscoides Phil. = Junellia mimutifolia (R. A. Phil.) Moldenke
Verbena mutabilis Jacq. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena mutabilis Willd. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena mysorensis Wight = Svensonia hyderobadensis (Walp.) Moldenke
Verbena myssorensis Wight = Svensonia hyderobadensis (Walp.) Moldenke
Verbena negundo Royle = Vitex negundo L.
Verbena nervosa Scheele = Buchnera elongata Sw., Scrophulariaceae
Verbena nigrescens Mart. = Stachytarpheta glauca Cham.
Verbena nispida Sessé & Moc. = Priva lappulacea (L.) Pers.
Verbena nodiflora C. Bauh. = Phyla nodiflora (L.) Greene
Verbena nodiflora L. = Phyla nodiflora (L.) Greene
Verbena nodiflora Petagn. = Phyla nodiflora (L.) Greene
Verbena nodiflora arborescens Mart. = Lippia javanica (Burm. f.) Spreng.
Verbena nodiflora var. sublanceolata Née = Phyla nodiflora var. rosea (D. Don) Moldenke
Verbena nodosa Rich. = Phyla nodiflora (L.) Greene
Verbena nubigena Poepp. = Junellia caespitosa (Gill. & Hook.) Moldenke ?
Verbena nubigena Speg. = Junellia spegazzinii Moldenke
Verbena nudiflora L. = Phyla nodiflora (L.) Greene
Verbena ochreata Briq. = Junellia spathulata (Gill. & Hook.) Moldenke

Verbena odorata Desf. = Lippia javanica (Burm. f.) Spreng.
Verbena odorata L'Hér. = Lippia alba (Mill.) N. E. Br.
Verbena officinalis Cuevas = Stachytarpheta jamaicensis (L.) Vahl
Verbena officinalis L. x Veronica maritima L. = xVeronicena haartmani Moldenke
Verbena orchioides Hort. = Castelia cuneato-ovata Cav.
Verbena orchioides Walp. = Castelia cuneato-ovata Cav.
Verbena orubica L. = Stachytarpheta orubica (L.) Vahl
Verbena orubica, teucriifolio, primulae veris flore Herm. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena ourostachya Briq. = Junellia echegarayi (Hieron.) Moldenke
Verbena oxytetragona Mart. = Stachytarpheta gesnerioides var. cuneata Schau.
Verbena patagonica Moldenke = Junellia patagonica (Speg.) Moldenke
Verbena patagonica Speg. = Junellia patagonica (Speg.) Moldenke
Verbena philippiana Kuntze = Junellia minutifolia (R. A. Phil.) Moldenke
Verbena polycephala Turcz. = Junellia selaginoides (Kunth) Moldenke
Verbena polycnemoides Lag. = Junellia minima (Meyen) Moldenke ?
Verbena prichardi Rendle = Junellia patagonica (Speg.) Moldenke
Verbena prismatica Jacq. = Bouchea prismatica (L.) Kuntze
Verbena prismatica L. = Bouchea prismatica (L.) Kuntze
Verbena prismatica Willd. = Bouchea prismatica (L.) Kuntze
Verbena prismatifolia Pers. = Bouchea prismatica (L.) Kuntze
Verbena pritchardi Rendle = Junellia patagonica (Speg.) Moldenke
Verbena psamophila Mart. = Stachytarpheta canescens H.B.K.
Verbena pseudogervao A. St. Hil. = Bouchea fluminensis (Vell.) Moldenke
Verbena pseudogervaõ St.-Hil. = Bouchea fluminensis (Vell.) Moldenke
Verbena pseudo-gervao A. St.-Hil. = Bouchea fluminensis (Vell.) Moldenke
Verbena pseudo-gervão St. Hil. = Bouchea fluminensis (Vell.) Moldenke
Verbena pseudojuncea Clos = Junellia pseudo-juncea (C. Gay) Moldenke
Verbena pseudo-juncea C. Gay = Junellia pseudo-juncea (C. Gay) Moldenke
Verbena punctulata Hieron. = Junellia punctulata Hieron. & Moldenke
Verbena pygmaea R. Fries = Junellia pygmaea (R. Fries) Moldenke
Verbena repens Bertol. = Phyla nodiflora (L.) Greene
Verbena repens Larraß. = Phyla nodiflora (L.) Greene

Verbena repens Savi = Phyla nodiflora (L.) Greene
Verbena repens Ten. = Phyla nodiflora var. rosea (D. Don) Moldenke
Verbena reptans Loisel. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Verbena rhinanthifolia Mart. & Gal. = Priva grandiflora (Ort.) Moldenke
Verbena rubiginosa Gill. = Acantholippia seriphioides (A. Gray) Moldenke
Verbena rubiginosa Hook. = Acantholippia seriphioides (A. Gray) Moldenke
Verbena salviaefolia Hook. & Arn. = Aloysia salviaefolia (Hook. & Arn.) Moldenke
Verbena sanguinea Mart. = Stachytarpheta sanguinea Mart.
Verbena sarmentosa Willd. = Phyla nodiflora (L.) Greene
Verbena scabra Muhl. = Phyla lanceolata (Michx.) Greene
Verbena scirpea R. A. Phil. = Diostea juncea (Gill. & Hook.) Miers
Verbena scoparia Gill. & Hook. = Diostea scoparia (Gill. & Hook.) Miers
Verbena scoparia Hook. = Diostea scoparia (Gill. & Hook.) Miers
Verbena scoparia Hook. & Gill. = Diostea scoparia (Gill. & Hook.) Miers
Verbena scoparium Gill. & Hook. = Diostea scoparia (Gill. & Hook.) Miers
Verbena selaginoides Kunth = Junellia selaginoides (Kunth) Moldenke
Verbena selaginoides var. illapelina Phil. = Junellia illapelina (R. A. Phil.) Moldenke
Verbena selaginoides var. illapelina Reiche = Junellia illapelina (R. A. Phil.) Moldenke
Verbena seriphioides Gill. & Hook. = Junellia seriphioides (Gill. & Hook.) Moldenke
Verbena seriphiodes Gill. & Hook. = Junellia seriphioides Gill. & Hook.) Moldenke
Verbena serpillifolia (Speg.) Speg. = Junellia serpyllifolia (Speg.) Moldenke
Verbena serpyllifolia Speg. = Junellia serpyllifolia (Speg.) Moldenke
Verbena serpyllifolia (Speg.) Speg. = Junellia serpyllifolia (Speg.) Moldenke
Verbena silvestrii Speg. = Junellia silvestrii (Speg.) Moldenke
Verbena spartioides Turcz. = Diostea cinerascens (Schau.) Moldenke
Verbena spartoides Turcz. = Diostea cinerascens (Schau.) Moldenke
Verbena spathulata Gill. = Junellia spathulata (Gill. & Hook.) Moldenke
Verbena spathulata Gill. & Hook. = Junellia spathulata (Gill. & Hook.) Moldenke
Verbena spathulata Hook. = Junellia spathulata (Gill. & Hook.) Mol-

denke
Verbena spathulata var. grandiflora Schau. = Junellia spathulata (Gill. & Hook.) Moldenke
Verbena spathulata var. pseudojuncea Reiche = Junellia pseudojuncea (C. Gay) Moldenke
Verbena spathulata α grandiflora Schau. = Junellia spathulata (Gill. & Hook.) Moldenke
Verbena spathulata β parviflora Schau. = Junellia spathulata (Gill. & Hook.) Moldenke
Verbena spicata jamaicana Pluk. = Bouchea prismatica (L.) Kuntze
Verbena spissa Sandw. = Junellia spissa (Sandw.) Moldenke
Verbena squamosa Jacq. = Elytraria squamosa (Jacq.) Lindau, Acanthaceae
Verbena stenophylla Scheele = Buchnera lavandulacea Cham. & Schlecht., Scrophulariaceae
Verbena stoechadifolia Br. = Phyla stoechadifolia (L.) Small
Verbena stoechadifolia L. = Phyla stoechadifolia (L.) Small
Verbena struthiomum Speg. = Junellia struthiomum (Speg.) Moldenke
Verbena subfruticosa Aubl. = Phyla stoechadifolia (L.) Small
Verbena succulentifolia Kuntze = Junellia succulentifolia (Kuntze) Moldenke
Verbena suffruticosa Aubl. = Phyla stoechadifolia (L.) Small
Verbena suffruticosa Steud. = Phyla stoechadifolia (L.) Small
Verbena supina Trag. = Bidens tripartita L., Carduaceae
Verbena tetragonocalyx Troncoso = Junellia tetragonocalyx (Troncoso) Moldenke
Verbena thymifolia Lag. = Junellia thymifolia (Lag.) Moldenke
Verbena thymifolia var. minutifolia (Phil.) Speg. = Junellia minutifolia (R. A. Phil.) Moldenke
Verbena thymoides Phil. = Junellia mimutifolia (R. A. Phil.) Moldenke
Verbena tiliaefolia Cham. = Lantana tiliaefolia Cham.
Verbena tiliifolia Cham. = Lantana tiliaefolia Cham.
Verbena toninii Kuntze = Junellia ameghinoi (Speg.) Moldenke
Verbena tridactyla Phil. = Junellia tridactyla (R. A. Phil.) Moldenke
Verbena tridactylides Lag. = Junellia tridactylites (Lag.) Moldenke
Verbena tridactylites Lag. = Junellia tridactylites (Lag.) Moldenke
Verbena tridactylitis Lag. = Junellia tridactylites (Lag.) Moldenke
Verbena tridens Lag. = Junellia tridens (Lag.) Moldenke
Verbena tridentata Lag. = Junellia tridens (Lag.) Moldenke
Verbena triflora Peter = Aloysia triphylla (L'Hér.) Britton
Verbena trifoliata P. Beauv. = Veronica spuria L., Scrophulari-

aceae

Verbena trifurcata R. A. Phil. = Junellia trifurcata (R. A. Phil.) Moldenke

Verbena tripartita Phil. = Junellia trifurcata (R. A. Phil.) Moldenke

Verbena triphila Willd. = Aloysia triphylla (L'Hér.) Britton

Verbena triphyla Willd. = Aloysia triphylla (L'Hér.) Britton

Verbena triphylla L'Hér. = Aloysia triphylla (L'Hér.) Britton

Verbena tuberosa R. Graham = Castelia cuneato-ovata Cav.

Verbena tuberosa Sessé & Moc. = Priva grandiflora (Ort.) Moldenke

Verbena ulicina R. A. Phil. = Junellia ulicina (R. A. Phil.) Moldenke

Verbena uncinata Waterfall = Priva mexicana (L.) Pers.

Verbena uniflora R. A. Phil. = Junellia uniflora (R. A. Phil.) Moldenke

Verbena uniflora var. glabriuscula Kuntze = Junellia uniflora var. glabriuscula (Kuntze) Moldenke

Verbena valparaisos Lejeune = Phyla nodiflora var. rosea (D. Don) Moldenke

Verbena variabilis Hort. = Stachytarpheta cayennensis (L. C. Rich.) Vahl

Verbena verbenaefolium Michx. = Stylodon carneus (Medic.) Moldenke

Verbena verticifolia L. = Stylodon carneus (Medic.) Moldenke

Verbena violacea Walker = Stachytarpheta urticaefolia (Salisb.) Sims

Verbena virgata Ruíz & Pav. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.

Verbena wilczekii Briq. = Junellia wilczekii (Briq.) Moldenke

Verbena yamaicensis L. = Stachytarpheta jamaicensis (L.) Vahl

"Vervain sage" is Salvia verbenacea L. in the Lamiaceae, "vervain mallow" is Malva alcea L. in the Malvaceae, and the "vervain hummingbird" is Mellisuga minima of Jamaica. The "lavender verbena" of Andreas Feininger (photographer) in Life 28 (15): 65 & 68—69 [color illustration], April 10, 1950, from the Borrego Desert, San Diego County, California, is Abronia villosa S. Wats. in the Nyctaginaceae.

The Hicken, Sert. And. references in the bibliography of this genus are often dated "1922", but should be 1923. The A. W. Chapm., Fl. South. U. S. (1860, 1865, 1872, 1884, 1887, 1889, and 1892) references in the generic bibliography on pages 100—102 are there erroneously written "Fl. Southeast. U. S." and should be corrected.

The Sharp, Clebsch, & Clebsch 4948, distributed as "Verbena sp.", appears to be a species of composite; the Mrs. Neff Bakker s.n. [Herb. San Diego Soc. Nat. Hist. 12751], also so distributed, is Teucrium occidentale A. Gray in the Lamiaceae, while Goodspeed

s.n. [Ft. Lauderdale, Mch. 1930; Herb. Iowa State Coll. 136138] is Pycnothymus rigidus (Bart.) Small in the Lamiaceae, Shreve & Tinkham 9896 is Marilaunidium hispidum (A. Gray) Kuntze in the Hydrophyllaceae, F. C. Gates 21124 is Veronica officinalis L. in the Scrophulariaceae, Hitchcock & Stanford 6952 (Po--266725, Se--58765) is Schobera angiosperma (J. Murray) Britton in the Heliotropiaceae, Rowell 2308 is Elytraria bromoides Ørst. in the Acanthaceae, and Edw. Palmer 13 is something not verbenaceous. In various herbaria sheets of Mimulus moschatus Dougl. (Scrophulariaceae), Hemizonia fasciculata T. & G. (Carduaceae), and Conoclinium coelestinum (L.) DC. (Carduaceae) have been distributed as "Verbena sp." The Rambo 3445, also so distributed, is something in the Lamiaceae.

Isern 2499, in the Madrid and Chicago Natural History Museum herbaria, from Tacora, Peru, is an as yet unidentified species of Verbena. Raimondi (1943) cites his numbers 2063 and 2064 from Cajamarca, Peru, as "Verbena sp.", but these have not as yet been seen by me for further identification. The "Verbena sp." recorded by H. S. Gentry in his "Rio Mayo Plants" (1942) is actually two species -- his no. 557 from Mesa Colorado is V. canescens H.B.K., while nos. 1522 and 1758 from Sierra Chacuro and no. 1923 from Cerro Guicorichi are V. pinetorum Moldenke.

Pulver (1937) says that wire hairpins are useful in pegging down verbena stems, but he is here referring to the prostrate-branching cultivated species such as V. hybrida, V. tenera, V. tenuisecta, etc. Cheesman says that "Verbena spp." are common in gardens on Trinidad. Hoehne (1939) reports that plants of the Verbena and Mint Families are used in Brazil to make perfumes called "cambarás" and "herva cidreira". Von Hagen (1937) affirms that a Verbena species which the Jivaro Indians [Amerinds] call "yapau", when mixed with one of the Amaranthaceae, is efficaceous against fevers in Ecuador.

Noack (1937) discusses the genetics and chromosome numbers in the genus, as do also Schnack & Covas in their various publications. Junell (1934) discusses the gynoecium morphology. Rosengurtt Gurvich (1941) calls the Uruguayan members of the genus "hemicriptofitas leñosas". The physico-chemical properties of the sap of a Verbena species in relation to phytogeography are discussed by J. A. Harris in his Physico-chem. Prop. Plant Saps 178 (1934) -- his specimen voucher was taken from low ground back of small sand dunes near the point of Tybee Island, Savannah River, Georgia, no. V.19-755 (1). The genus is mentioned by L. R. Parodi (1943) as growing in the climax steppe formation in the Eliomurus viridulus zone, in the department of San Martín, Corrientes, Argentina, along with Cyperus, Fimbristylis, Juncus, Nothoscordum, Spergularia grandis, Oxalis, Melochia, Eryngium, Buchnera, Wahlenbergia, Vernonia, Stevia, and Baccharis.

Although we now recognize 363 taxonomic entities in the genus, Bentham in 1876 and Pearson as late as 1901 regarded the genus as comprising only 80 species.

Westcott (1950) lists as diseases attacking the native species in the United States: Plasmopara halstedii (downy mildew, in New Mexico), Ascochyta verbenae (leaf-spot, in Wisconsin), Cercospora verbenicola (leaf-spot, in Alabama, Louisiana, and Texas) and other species of Cercospora (in Illinois, Kansas, and Mississippi), Phyllosticta texensis (leaf-spot, in Texas), Septoria verbenae (leaf-spot, from Vermont to Mississippi, Texas, and South Dakota), Erysiphe cichoracearum (powdery mildew, general distribution), Puccinia aristidae (rust, in Ohio [January] and Arizona [February & March] on grasses), and Puccinia vilfae (rust, in Ohio [January] and Indiana to Oklahoma to Kansas, Missouri and South Dakota). She states that Cuscuta arvensis Beyr. parasitizes the genus in Oklahoma, while Yuncker (1943) says that members of the genus are parasitized by C. glabrior (Engelm.) Yuncker in Texas. A spider mite, Tetranychus desertorum Bank, winters on a Verbena species in the Paraguayan Chaco. Verbena leaves are said to be eaten by the larvae of Acopa carina Harvey, Catabena lineolata Walker, and Crambodes talidiformis Guenée, according to W. J. Holland, Moth Book 163 (1904) in the United States.

Houard (1933) says that insect galls occur on the leaves of Verbena species. Seymour (1929) reports that on species of this genus may be found the fungi Rhizoctonia solani Kuhn and Sphaerotheca humuli (DC.) Burrill. Felt, in Bull. N. Y. State Mus. 200: 182 (1917), describes a gall on Verbena, reared from the rolled leaves, caused by a probably predaceous itonid gall-fly, Lestodiplosis verbenifolia Felt, originally described by him in Bull. N. Y. State Mus. 104: 408 (1908). In his same 1917 work he describes two galls on unidentified members of the Verbena genus: one is an irregular oval stem-gall 3--5 mm. long, caused by an itonid, Cecidomyia sp. (described by Felt in Journ. Econ. Ent. 4: 474. 1911), the other, reared from marginal leaf rolls, being an itonid known as "Verbena leaf midge", Itonida verbenae Beutm. (described by Beutenmueller in Canad. Ent. 39: 306. 1907).

VERBENA ABRAMSI Moldenke, Am. Midl. Nat. 24: 750--751. 1940.

Synonymy: Verbena lasiostachys var. abramsii (Moldenke) Jepson, Fl. Calif. 3 (2): 381. 1943. Verbena abramsii Moldenke ex Jepson, Fl. Calif. 3 (2): 381, in syn., sphalm. 1943.

Literature: Perry, Ann. Mo. Bot. Gard. 20: 292. 1933; Moldenke, Am. Midl. Nat. 24: 750--751. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 15 & 101. 1942; Jepson. Fl. Calif. 3 (2): 381. 1943; Moldenke, Phytologia 2: 70 & 114. 1945; Moldenke, Alph. List Cit. 1: 2, 3, 56, 72, 121, & 135. 1946; Moldenke, Phytologia 2: 383. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 22 & 25. 1947; Moldenke,

Castanea 13: 113. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 48. 1948; Moldenke, Alph. List Cit. 2: 396, 439, 465, 467, 472, 482, 488, 495, 500, 560, 570, 576, & 587 (1948), 3: 718, 755, 786, 794, 799, 808, 832, & 841 (1949), and 4: 980, 1119, 1177, 1181, 1182, 1215, 1225—1230, & 1252. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 27 & 197. 1949; Moldenke, Résumé 33, 357, 368, & 470. 1959.

Bushy perennial herb, often somewhat woody at the base, 5—7 dm. tall; stems erect or branching from the base and laxly prostrate-ascending or prostrate, slender, tetragonal, usually thick-margined on the angles, densely short-hirsute with brownish or canescent hairs issuing at right angles to the stem, less so in age; branches similar to the stems, but even more densely and persistently short-hirsute; leaves sessile, oblanceolate or obovate, 1.5—9.5 cm. long, 0.5—3.5 cm. wide, usually small, dark-green on both surfaces, often brunnescent in drying, acute at the apex, cuneate at the base, irregularly incised-dentate except at the cuneate base, sometimes the 2 lowermost divisions lobe-like, densely short-strigose with closely appressed hairs and scabrous or subscabrous above, densely strigose-pubescent or subhirsutulous beneath; inflorescence spicate, terminal; spikes elongate, to 12 or more cm. long, slender, about 5 mm. wide, dense before anthesis, loosely many-flowered after anthesis, the fruiting-calyxes not imbricate; bractlets ovate, about 2 mm. long, acute at the apex, densely hirsutulous-pubescent; flowers very small; calyx very small, 2—3 mm. long in all, densely hirsutulous, its rim very minutely toothed with very short and obscure apiculate teeth; corolla purple or lavender to blue, its tube about 4 mm. long, its limb about 2.5 mm. in diameter.

The type of this distinct species was collected by Edward Palmer (no. 309) at Hot Springs, in the southern part of San Diego County, California, in 1875, and is deposited in the Morong Herbarium of Barnard College at the New York Botanical Garden. The species has in the past been confused and united with V. lasiostachys Link, from which its small and minutely toothed calyxes at once distinguish it. It is named in honor of the distinguished California botanist, Dr. LeRoy Abrams, who collected it in the San Gabriel Mountains at an altitude of 3000 feet.

Collectors have found this plant on dry hillsides with grass cover and desert slopes, on gentle slopes near ponds, in damp earth, damp meadows, or damp land in general, meadows or swamps, damp streambanks, river-bottoms, and plains, sometimes in alkaline soil, at altitudes of 500 to 3000 feet, blooming an fruiting from April to October. A popular name is "common vervain". Herbarium material has been misidentified as V. lasiostachys Link, V. menthaefolia Benth., V. officinalis L., V. polystachya H.B.K., V. prostrata R. Br., V. scabra Vahl, and V. urticifolia L. Balls found it "spontaneous in Botanical Garden trickle", Los Angeles County. Parish says that it is "The prevalent form here [San Bernardino County], meadows, etc." Twisselmann found it "growing in mud of wet seep in open pasture, scarce in dense growth of Mimulus

guttatus, Scirpus sp....in grassland of Upper Sonoran" zone in San Luis Obispo County. The label on Blankinship s.n. [Sept. 23, 1928] says "apparently an introduced weed".

Culbertson 4210 is a mixture with V. lasiostachys, and H.210 as well as K. Brandegee s.n. [Jolon, June 19, 1908] are mixtures with V. lasiostachys var. septentrionalis Moldenke, while Abbott s.n. [Monterey, 1889] is a mixture with V. robusta Greene. The K. Brandegee s.n. [Aug. 1905], at first determined as V. officinalis L. by L. W. Reinecke, was later re-determined by him as V. menthaefolia Benth. He says that Miss Perry cites this collection as V. menthaefolia in her monograph of the genus in Ann. Mo. Bot. Gard. 20 (1933), but she does *not*.

Miss Perry (1933) noted the differences between this species and V. lasiostachys, but did not give a name to the plant. She says that "The following specimens differ from the species in having scarcely glandular inflorescences and fruiting calyx only 2.5—3 mm. long shortly conniving beyond the fruit.." and then cites five of the collections which I enumerate herein under V. abramsi, with the following 6 additional specimens which I have not as yet seen: CALIFORNIA: San Bernardino Co.: S. B. Parish 2819 (E); Parish & Parish 969 (F, W). San Diego Co.: Edw. Palmer 309 (E, G). Tulare Co.: Culbertson 4210, in part (E). She also cites Abrams 2481 from Los Angeles County, but I regard this as V. lasiostachys var. scabrida Moldenke.

In all, 62 herbarium specimens, including the types of all the names involved, have been examined by me.

Citations: CALIFORNIA: Fresno Co.: K. Brandegee s.n. [Fresno, July 21, 1905] (Ca—185315). Inyo Co.: Horn s.n. [in Owens Valley and at Fort Tejon, 1863] (N). Lake Co.: Blankinship s.n. [Sept. 23, 1928] (Rs—2766). Los Angeles Co.: Abrams & McGregor 689 (Du—24205, N); E. B. Babcock s.n. [near Pomona, Aug. 24, 1902] (Ca—56930); E. K. Balls 19393 (Au—122335); Braunton 520 (Du—75593, Du—78780), s.n. [Nov. 1902] (Du—75595); J. B. Davy 2859 (Ca—25165); Dressler 69 (Ak—29781, Ak—29784); Illingworth 74 (Po—4009); Munz 6919 (N, Po—18355); Pruett 61 (Po—4126); R. B. Randall 282 (Sd—4255); L. C. Wheeler 13 (La). Mariposa Co.: Congdon C.95 (N). Monterey Co.: E. K. Abbott 1889 (Um—19), s.n. [Monterey, 1889] (Mn—23135, N); K. Brandegee s.n. [Jolon, June 19, 1908] (Ca—112914); H. L. Mason 8149 (Ca—912303); Simontacchi 628 [U. S. Dept. Agr. Forest Serv. 23820] (Ca—124418). Orange Co.: J. T. Howell 448 (Rs—654), 2806 (Gg—176994). Riverside Co.: M. A. King s.n. [Menifee, 1893] (Ca—75796); McClatchie s.n. [near Elsinore, 5/16/1892] (N). Sacramento Co.: Bruce 1977 (Po—71012). San Bernardino Co.: S. B. Parish 2819 (Ob—50826, Po—4002, S, Ur), 6295 (Au), 10548 (Du—91160), s.n. [July 1887] (Ca—25164), s.n. [Sept. 1887] (I), s.n. [Aug. 1889] (Dt), s.n. [July 1894] (Ca),

s.n. [6 June 1898] (N), s.n. [May 29, 1901] (Du--143856); Parish & Parish 969 (Al, Br, Ca--192067, Du--91137, Io--92219); Pequegnat s.n. [Coldwater Canyon, 25,VIII.37] (La). San Diego Co.: G. W. Dunn s.n. [San Diego] (Ca--104851); Edw. Palmer 309 (Bc--type, Ca--187503--isotype, Pa--isotype). San Joaquin Co.: Suksdorf 3b (Pl--138410). San Luis Obispo Co.: Eastwood 14984 (Gg--147762); Twisselmann 1485 (Gg--391013). Trinity Co.: E. P. Johnson 1163 (Rs--1109). Tulare Co.: K. Brandegee s.n. [Aug. 1905] (Ca--185373); Culbertson 4210, in part (Po--63887), H.210, in part (Gg--31352). County undetermined: Parry & Lemmon 342 (C, Io).

xVERBENA ADULTERINA Hausskn. in Nyman, Consp. Fl. Eur. Suppl. 2 (1): 245. 1889 [not xV. adulterina Moldenke, 1955].

Synonymy: Verbena officinalis x supina Hausskn., Mittheil. Thüring. Bot. Ver., new ser., 10: 65. 1897. Vitex adulterina Hansskn. ex A. W. Hill, Ind. Kew. Suppl. 6: 210, sphalm. 1926.

Literature: Nyman, Consp. Fl. Eur. Suppl. 2 (1): 245. 1889; Hausskn., Mittheil. Thüring. Bot. Ver., new ser., 10: 65--66. 1897; Durand & Jacks., Ind. Kew. Suppl. 1: 451. 1906; A. W. Hill, Ind. Kew. Suppl. 6: 210. 1926; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 102 (1942) and [ed. 2], 108 & 200. 1949; Moldenke, Phytologia 5: 132. 1955; Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Am. Midl. Nat. 59: 341--342, 344, & 365. 1958; Moldenke, Résumé 357. 1959; Moldenke, Résumé Suppl. 2: 6, 10, 12, 13, & 15. 1960.

This name was first proposed by Haussknecht in Nyman's 1889 work, cited above, for the natural hybrid between V. officinalis L. and V. supina L. which he found growing wild among the two parents in Greece. It is again discussed by him in the 1897 reference listed above and is correctly listed by Durand in 1906. Curiously, Hill, in 1926, apparently through some clerical error in filing and alphabetizing the card references at Kew, published it as "Vitex adulterina" and it was thus recorded by me in my Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 102 (1942) and [ed. 2], 108 & 200 (1949). Hill credits the name to the 1897 Haussknecht reference, but in this reference Haussknecht is plainly proposing a Verbena hybrid. There is no such thing as a "Vitex adulterina". Not knowing of Haussknecht's Verbena adulterina at the time, in 1955 I proposed another "xVerbena adulterina" for the hybrid between V. officinalis L. and V. halei Small. The latter is now known as xV. conata Moldenke

Recently I have examined material purporting to be the type collection of Haussknecht's plant and am unable to see any differences between it and typical V. officinalis. This specimen will be discussed by me in my treatment of the latter species. Because of this fact. I reduced Haussknecht's name to synonymy under V. officinalis in my Résumé in 1959. Nevertheless, V. officinalis and V. supina grow together in many parts of Europe and the Ori-

ent, where they are in most places the only representatives of the genus. A hybrid between them is certainly to be expected. It may well be that future study will reveal that some of the named "varieties" and "forms" of these two species may in actuality represent the hybrid instead. Experience with natural hybrids between other members of this genus (e.g., xV. engelmannii, xV. moechina, xV. rydbergii, etc.) has shown that the hybrid population, when extensive, usually shows every intergradation between the two parent species. It is possible, therefore, that the particular specimen of the type collection which I have seen represents a plant that was on the V. officinalis extreme in its superficial characters.

Haussknecht's original description is as follows: "inter parentes pr. Karditza Th[essalonica]. — Im Allgemeinen besitzen diese hybriden Formen mehr das Aussehen der V. officinalis, unterscheiden sich aber durch kürzere, gedrungenere Stengel, durch kleinere, feiner zertheilte Blätter, durch auffallend kürzer gestielte, später sich jedoch sehr verlängernde Ähren mit dicht gestellten Blüthen, die nur in der unteren Hälfte lockerer sind als bei V. supina; ferner durch breitere, etwas tiefer gespaltene Kelchzipfel und vor allem durch das die ganze Pflanze überziehende graue hispide Indument, welches jedoch schwächer ist als bei V. supina. Die zu Th. anscheinend entwickelten Samen sind im Inneren hohl."

VERBENA ALATA Sweet, Brit. Flow. Gard. 4 [ser. 2, 1]: pl. 41. 1830.

Synonymy: Verbena alata Otto ex Sweet, Hort. Brit., ed. 2, 418. 1830. Verbena alata Cham., Linnaea 7: 258--259. 1832. Verbena alata Link & Otto ex G. Don in Loud., Hort. Brit. Suppl. 1: 602. 1832. Verbena alata Hook. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena alata Cham. & Schlecht. ex Moldenke, Résumé 357, in syn. 1959.

Literature: Sweet, Brit. Flow. Gard. 4 [ser. 2, 1]: pl. 41. 1830; Sweet, Hort. Brit., ed. 2, 418. 1830; G. Don in Loud., Hort. Brit. Suppl. 1: 602. 1832; Cham., Linnaea 7: 258--259. 1832; Maund, Bot. Gard. 5: pl. 98. 1834--1835; Walp., Repert. 4: 17--18. 1845; Schau. in A. DC., Prodr. 11: 543. 1847; Schau. in Mart., Fl. Bras. 9: 190. 1851; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 146. 1894; Jacks., Ind. Kew. 2: 1178. 1895; Stapf, Ind. Lond. 6: 428. 1931; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 101. 1942; Augusto, Fl. Rio Grande do Sul 211, 215, & 233, fig. 100. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 22. 1947; Moldenke, Phytologia 2: 336. 1947; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 357 (1948), 3: 687, 751, 845, 922, & 923 (1949), and 4: 1124, 1180, 1233, & 1248--1251. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93, 163, & 197. 1949; Moldenke, Phytologia 3: 134 (1949) and 3: 466. 1951; Stellfeld, Trib. Farm. 19 (10): 166. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 2208--2210. 1951; Rambo, Sellowia 6:

153 & 165 (1954) and 7: 288. 1956; Moldenke, Résumé 109, 222, 357, & 470. 1959; Moldenke, Résumé Suppl. 2: 5, 8, 10, & 15. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961.

Illustrations: Sweet, Brit. Flow. Gard. 4 [ser. 2, 1]: pl. 41 (in color). 1830; Maund, Bot. Gard. 5: pl. 98 (in color). 1834--1835; Augusto, Fl. Rio Grande do Sul 215, fig. 100 [as "V. Lindmanii"]. 1946.

Erect, suffrutescent, rather robust perennial bush or subshrub, to 2 m. tall, or suffrutescent only at the base, with a peculiar broom-like appearance; stems subfastigiate, very sharply tetragonal and broadly winged, brachiate; branches sharply tetragonal or the larger ones subalate, appearing as though leafless, the flat sides smooth and canaliculate, slightly striate, the angles sometimes scabrous; nodes contracted; principal internodes 7.5--10 cm. long; leaves very small, sessile, mostly ovate or triangular-oblong, 0.5--2.5 (rarely to 6) cm. long, 2--5 (rarely to 11) mm. wide, acute at the apex, mostly truncate (rarely attenuate) at the base, entire or sharply serrate, 3-nerved, somewhat rugose above, strigillose-scabrous or subglabrescent on both surfaces, the upper ones often much reduced and bract-like or scale-like; inflorescence a terminal cymose panicle, subfastigiate, the spikes short and dense, at first ovoid and about 6 mm. long, later subcylindric and elongating to 2.5 cm.; peduncles slender, sharply 4-angled and canaliculate, strigose-scabrous; bractlets lanceolate, shorter than the calyx, usually about 2 mm. long, acuminate at the apex, strigillose; calyx green with carmine-lilac markings or else entirely carmine-lilac, about 3 mm. long, conspicuously and densely white-strigose with appressed antrorse hairs, its teeth subulate; corolla varying from blue or lilac to violet-blue, violet, or red, its tube usually about 5 mm. long, puberulent on the outside toward the throat, the limb 4--7 mm. wide; style equaling the calyx, its apex drooping; stigma declined; cocci about 2 mm. long, dark on the back, striate, the commissure angulate, white-leathery.

The type of this endemic Brazilian species was collected from cultivated material in England in 1830. Sweet says of it: "this fine specimen was sent to me by the kindness of Robert Barclay Esq. from his superb collection at Bury-hill, the plant had been procured for Mr. Barclay by Mr. Hunnemann, who received it from the Royal Botanical Garden at Berlin in 1828". He adds that "it is â native of Monte Video". Actually, I have seen no material of the species from Uruguay as yet, and the statement may well be an error. The original material without doubt came from seed sent by Friedrich Sellow, who collected it in "Brasilia meridionalis". Chamisso, who proposed the same binomial for the species, apparently independently, in 1832, says that his type material was growing in the Botanical Garden at Berlin, originally collected by Sellow in Brazil. The binomial was apparently used in the Botanical Garden and is sometimes credited to Otto or to Link & Otto. Sweet, however, appears to have been the first to publish it validly. The species has been widely cultivated, being known from gardens in England and Germany as early as 1828, in

Italy in 1849, and also in New Jersey. In its native haunts it is said to inhabit marshes, swamps, and pine woods, the edges of swamps, rather marshy places, woods on varzea land, wet grassy and rather open wet places in general, as well as along small streams and along streams in small woods, at altitudes of 840 to 1600 meters. It has been collected in anthesis from September to January, as well as in March and May, and in fruit in January. The only recorded common names are "winged-stalked vervain" and "winged-stem vervain" in England. According to Maund the plant will grow best in a rich light soil, attaining a height of 6 feet, becoming bold and handsome, although its flowers are not very conspicuous. It is not bushy and needs to be staked up if grown in the open. It may be raised from seeds or occasionally increased by division of the roots. It needs a little protection in winter if grown in areas where there are severe frosts.

The species is mentioned by Irmão Augusto in his "Flora do Rio Grande do Sul", pages 211 and 233 (1946), but his illustration is mis-labelled "Verbena Lindmanii". He says that Emrich collected the species at Arroyo Tiririca, Caracol, Rio Grande do Sul, but this specimen has not as yet been seen by me. Material of this species has been misidentified in herbaria as V. ephedroides Cham., V. litoralis L., V. litoralis Kunth, V. brasiliensis Vell., and even (by Dusén) as Neosparton ephedroides Griseb.

In all, 45 herbarium specimens, including type material of all the names involved, and 3 mounted photographs or illustrations have been examined.

Citations: BRAZIL: Minas Gerais: F. C. Hoehne s.n. [Pouso Alegre, May 2, 1927] (La, N, Sp--19358); Mosén 968 (N, S); Netto 334 (Ja--46550, N); Regnell I.326 [8/2/1865] (S), I.326b (S); Widgren s.n. [1845] (Lu, Ut--11584), s.n. [Brasilia] (N, S). Paraná: Dusén 26 (S), 2788 (S), 3061 (S), 5061 [Herb. Mus. Nac. Rio Jan. 46570] (N), 7541 (S), 10753 (S), 18047 (S); Hatschbach 3366 (Z), 35956 (Rb); Tessmann 3399 [Herb. Mus. Paran. 3399] (N), 3400 [Herb. Mus. Paran. 3400] (N). Rio Grande do Sul: Costa Sacco 411 [Herb. Hort. Bot. 1315] (N); Kleericoper 12 [Herb. Mus. Nac. Rio Jan. 48452] (N); Rambo 436, in part (N), 44083 (N), 49719 (N), 54735 (B). Santa Catarina: F. Müller s.n. [Herb. Mus. Nac. Rio Jan. 31564] (N); Reitz 1965 (N), 6831 (N); Reitz & Klein 5484 (N, Ok); Smith & Klein 8065 (Ok), 9059 (Ok); Ule 1068 (W--1323144). São Paulo: Brade 5737 (S); Leite 3744 (El, N). State undetermined: Sellow s.n. [Brasilia; Macbride photos 17399] (Kr--photo, N--photo, N, Vt). CULTIVATED: France: Herb. Martens s.n. [h. b. Par. 1835] (Br). Italy: Herb. Harvey s.n. [h. P. Septb. 1849] (Du--166469, in part). New Jersey: Guyot s.n. (Pr). MOUNTED ILLUSTRATIONS: Maund, Bot. Gard. 5: pl. 98. 1834--1835 (N).

VERBENA ALATA f. ALBA Moldenke, Phytologia 3: 426. 1951.
Literature: Moldenke, Phytologia 3: 426 & 453. 1951; Moldenke,

Biol. Abstr. 25: 3051. 1951; Moldenke, Résumé 109 & 470. 1959.

This form differs from the typical form of the species in having white or whitish corollas.

The type of the form was collected by Anders Frederik Regnell (no. I.326, in part) at Serra do Caldas, Minas Gerais, Brazil, on October 16, 1861, and is deposited in the Britton Herbarium at the New York Botanical Garden. The same number, collected on February 8, 1865, appears to be typical V. alata Sweet. The white-flowered form is known thus far only from Minas Gerais. In all, 4 herbarium specimens, including the type, have been examined.

Citations: BRAZIL: Minas Gerais: Regnell I.326 [16/10/1861] (N--type, S--isotype, S--isotype), I.326 [20/11/1867] (S).

VERBENA AMBROSIFOLIA Rydb. in Small, Fl. Southeast. U. S., ed. 1, 1011 & 1337. 1903.

Synonymy: Verbena ambrosiaefolia Rydb. apud Wooton & Standl., Contrib. U. S. Nat. Herb. 19: 549. 1915. Verbena ambrosiafolia Rydb. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena ambrosiifolia Rydb. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941; Rzedowski, Ciencia 15: 147. 1955. Verbena androsaemifolia Ricker, Kodachrome Slides of Wild Fls. [4], hyponym. 1953. Verbena ambrosioides Rydb. ex Moldenke, Résumé 357, in syn. 1959. Verbena ambrosifolia Perry ex Moldenke, Résumé 357, in syn. 1959. Verbena bipinnatifida x wrightii Wooton ex Moldenke, Résumé 358, in syn. 1959. Verbena bipinnatifolia var. latifolia Scholl ex Moldenke, Résumé 358, in syn. 1959. Verbena ambrosaefolia Rydb. ex Moldenke, Résumé Suppl. 2: 10, in syn. 1960. Verbena bipinnatifida var. latifolia Scholl ex Moldenke, Résumé Suppl. 2: 10, in syn. 1960.

Literature: Small, Fl. Southeast. U. S., ed. 1, 1011 & 1337. 1903; Prain, Ind. Kew. Suppl. 3: 187. 1908; Small, Fl. Southeast. U. S., ed. 2, 1011. 1913; Wooton & Standl., Contrib. U. S. Nat. Herb. 19: 549. 1915; Rydb., Fl. Prairies & Plains 678. 1932; Perry, Ann. Mo. Bot. Gard. 20: 248, 312, 325--328, 331, & 354. 1933; Dermen, Cytologia 7: 160--175. 1936; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Wyman & Harris, Navajo Ind. Med. Ethnobot. 18, 23, & 44. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 18 & 41--42. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 8--12, 14, 18, & 101. 1942; Schnack & Covas, Darwiniana 6: 471. 1944; Moldenke, Phytologia 2: 126. 1944; Moldenke, Castanea 10: 39. 1945; Darlington & Janaki Ammal, Chromosome Atlas 270. 1945; Schnack & Covas, Darwiniana 7: 71. 1945; Moldenke, Am. Journ. Bot. 32: 610. 1945; G. L. Fisher, Am. Bot. Exchange List. 1946; Moldenke, Alph. List Cit. 1: 4, 14, 23, 34, 99, 126--129, 144, 154, 158, 175, 182, 242, & 256. 1946; Moldenke, Phytologia 2: 159 (1946) and 2: 327 & 328. 1947; Curtin, Healing Herbs Upper Rio Grande 131 & 272. 1947; Moldenke, Castanea 13: 112. 1948; Moldenke, Wrightia 1: 233. 1948; Moldenke, Alph. List Cit. 2: 370, 392, 393, 396, 398--400, 438, 439, 450, 453--456, 467, 468, 472--477, 482, 491, 493--495, 498, 5003--5006, 511, 517, 523, 525, 527,

539, 549, 572, 594, 618, & 640 (1948), 3: 656, 677, 679, 708, 713, 720, 723, 737, 748, 754, 768, 782—784, 787, 789, 790, 801, 805, 827, 829, 831, 839, 842, 843, 858, 870, 873, 904, 905, 917, 931, 933, 939, 950, 954, 965, 970, & 976 (1949), and 4: 989, 991, 1068, 1072, 1086, 1093, 1094, 1107, 1108, 1110, 1112, 1121, 1122, 1129, 1138, 1141, 1142, 1148, 1150—1152, 1154, 1166, 1167, 1170, 1173, 1174, 1181, 1183, 1203, 1205, 1207, 1212, 1213, 1216, 1220, 1223—1225, 1227, 1229—1231, 1237, 1240, 1243, 1246, 1247, 1252, 1253, 1255, 1289—1291, & 1294. 1949; Moldenke, Am. Wild Fls. 292 & 450. 1949; Moldenke, Phytologia 3: 132. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 16, 18, 20, 21, 23, 25, 26, 32, & 197. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Ricker, Kodacrome Slides of Wild Fls. [4]. 1953; C. M. Rogers, Rhodora 56: 207. 1954; Rzedowski, Ciencia 15: 147. 1955; Moldenke, Résumé 20, 22, 24, 25, 28, 30, 31, 38, 357, 358, & 470. 1959; Moldenke, Résumé Suppl. 2: 3 & 10. 1960.

Annual with short taproot or perennial bushy herb, usually low-growing and spreading in dense circles to 2 m. in diameter; stems more or less diffusely branched from the base, mostly spreading to about 25 cm., occasionally erect and 30 cm. tall or loosely decumbent-ascending, somewhat hirsute; leaves decussate-opposite, short-petiolate, the blades 2—6 cm. long, bipinnatifid with the ultimate segments lanceolate, appressed-hirsute on both surfaces, slightly revolute along the margins; spikes pedunculate or subsessile, fascicle-like during anthesis, somewhat elongate in fruit; bractlets a little shorter than the calyx, lanceolate-subulate, hirsute, ciliate; flowers odorless; corolla varying from purple, reddish-purple, bright reddish-purple, or blue-purple to lavender, magenta, rose, violet, or deep-pink, its tube 1 1/3 to 1 1/2 times as long as the calyx, pubescent outside, its limb 6—8 [—10] mm. wide; fruiting-calyx 8—9 mm. long, glandular-pubescent, hirsute particularly along the nerves, its teeth long-subulate and often coarctate; cocci subcylindric, often with a slightly broadened base, 2.5—3 mm. long, reticulate-scrobiculate above, striate below, the commissural faces muricately scabrous; chromosome number: 2n = 30.

The type of this species was collected by George Everett Osterhout at Rocky Ford, Otery County, Colorado, on June 8, 1900, and is deposited in the Britton Herbarium at the New York Botanical Garden. The type of V. bipinnatifida var. latifolia is Scholl 8 from Culberson County, Texas, deposited in the herbarium of the University of Texas at Austin, while that of V. bipinnatifida x wrightii is Wooton 642 from Dona Ana County, New Mexico, in the Britton Herbarium at the New York Botanical Garden. The homonymous designation, V. ambrosifolia Perry, was used by Demaree on his no. 13335 from Cimarron County, Oklahoma.

Miss Perry says "An examination of the type specimens of V. ambrosifolia and V. wrightii reveals differences probably sufficient to suggest distinct but closely related species. Typically the former is characterized by long calyx-teeth and coarser pubescence; whereas the latter has short calyx-teeth, finer and some-

what viscid pubescence. On the other hand, a study of the aggregate specimens of the two shows a high variability in the combination of these characters; moreover, their geographic ranges practically coincide. For these reasons, V. ambrosifolia is maintained as a species with very doubtful status."

V. ambrosifolia is a fairly widespread species, resembling V. canadensis (L.) Britton in its calyx-lobes and V. wrightii A. Gray in its leaves and glandular pubescence. It is sometimes difficult to distinguish from the latter species, as indicated by the quotation from Miss Perry. Typical specimens of the two species are, however, very distinct. Intermediate material may well be the result of natural hybridization, since hybridization seems to be an established characteristic of the genus and since the ranges of the two species seem to be practically identical.

V. ambrosifolia has been found by collectors on humus soil and gravel, in fields and valleys, deserts and dry grasslands, dry ground or moist loam, gulches and rocky hillside pastures, in sandy or gravelly calcareous soil, washes at the base of buttes, open places and bottom fields, pastures and open fields or mesas, wayside meadows and grassy flats in the foothills, rocky slopes, field margins and deep narrow canyons, pine-oak forests on igneous canyon slopes and dry level land, along sandy roadsides and moist streamsides, on prairies and high or open sandy plains, banks, limestone hillsides, alluvial flats near arroyos, red and blue shale banks, grassy or alkali flats, bluffs and rocky canyon walls, dry ridges and mesas, dry hillsides and foothills, railroad embankments and shady slopes, canyon pine slopes, limestone breaks and plains, in arroyos, on steep shale hillsides, along roadside ditches and dry creek beds, and at the edge of pinyon-cedar forests and wet-weather valley ponds. Ewan describes it as "handsome low-growing plants very abundant on mesas", "occasional along seeps in moist sandstone soils", "scattered over recently flooded floor of alfalfa fields", and "rather common in large clumps on dry hills". Earle says that it is "very common in juniper belt, blooming all summer", while Clute reports that it is "abundant in open places, spreading out in circles flat on the ground." Palmer affirms that it is "common on plains and low dry hills", while Nelson found it in "sandy draws in the hills." Cory says it is "frequent on roadsides and shoulders of highways", Goodman found it in "loose soil near highways", Warnock says it is "scattered along roadsides, infrequent", and Porter reports it "common along roadsides on the plains." Waterfall found it growing with grass and Flourensia on the Verhalen clay, on calcareous soil along ditches, on gravelly calcareous soil along creek beds, at the base of cliffs in yellow pine forests, in gypseous soil on level plains in Prosopis-Gutierrezia association, and on low ridges in fine possibly gypsiferous soil. Hopkins and Van Valkenburgh describe it from black volcanic rock and soil derived from it on dry xeric plateaus, while the Moores say it is "very common in limestone gravel soil on highway embankments", Muller found it "sparse on limestone", while Parks & Turner de-

scribe it as "infrequent on limestone soil along highways" and Webster found it "locally common around edge of intermittent pond" In Texas it grows in fields and prairies, on grassy and alkali flats, deserts, and mesas, and along roadsides from Hudspeth and Presidio to Val Verde Counties, blooming and fruiting from March to December. It has been found at altitudes of 50 to 8500 feet.

Rogers lists it with Muhlenbergia torreyi (Kunth) A. S. Hitchc., Oryzopsis hymenoides (Roem. & Schult.) Ricker, and Chrysothamnus nauseosus (Pall.) Britton as being restricted in its eastern distribution to the high plains, and reports that because of this fact it enters Oklahoma on the prairie grassland of the plains around the Mesa and on the level top where mature soils have developed and where climax vegetation is found under present climatic conditions.

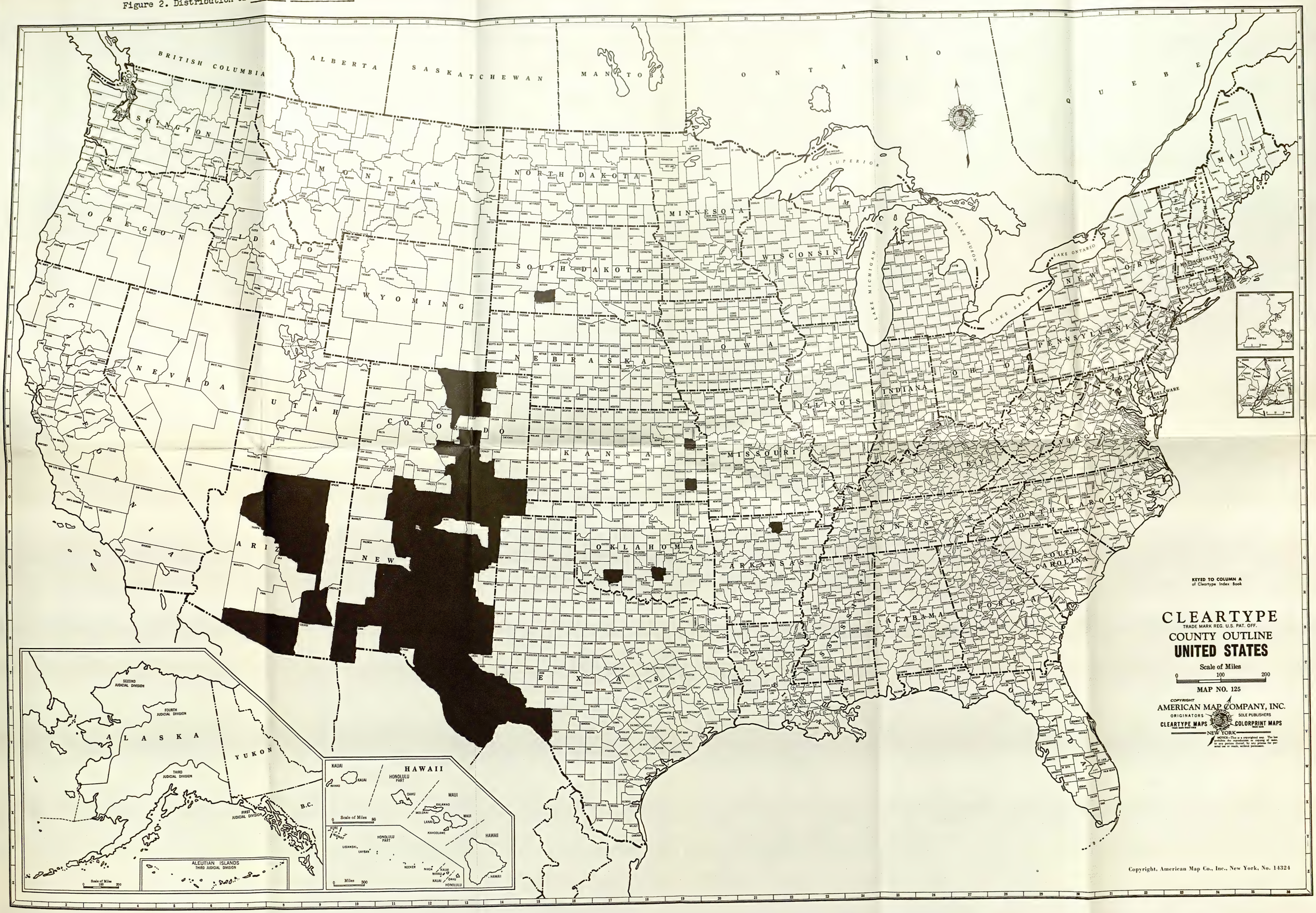
The common name "moradilla" is recorded for this species, and Curtin reports that "If a Spanish New Mexican has pains in the back, he makes a plaster of pitch combined with powdered moradilla and places it on the affected part of his body. But if he has 'nerves' or rheumatism, he prepares a bath with moradilla leaves, and drinks a tea similarly made. Although a number of other diseases have been confused with leprosy, the ground dry leaves [of this plant] are rubbed on spots that are supposedly symptomatic of this diabolical malady."

The Arsène 16555 and 18528 collections cited below are labeled "PL. du MEXIQUE", but were actually made in New Mexico in the United States. Perry states that Mearns 2677 is "atypical". The M. E. Jones s.n. [Colorado Springs, May 1878] is also not typical -- it was actually previously cited as V. bipinnatifida Nutt., but to this identification Weber objects! Ramaley 15322 was also previously cited as V. bipinnatifida; its glands are very sparse -- possibly it may represent V. ambrosifolia f. eglandulosa Perry.

The Utah State Agricultural College 11391 specimen is not numbered on the collector's label, but seems definitely to be a part of the M. E. Jones 122 collection, and is so cited by me hereinafter -- Dr. Holmgren has verified this. Nelson suggests on the sheet of Archibald A.255 seen by him that it probably represents a "new species". The Lundell & Lundell 7056, previously cited as V. ambrosifolia, actually is V. bipinnatifida. The Hitchcock & Stanford 6782 specimen in the herbarium of Oregon State College seems definitely to be V. ambrosifolia -- not V. wrightii A. Gray as are the rest of the specimens of this collection in other herbaria. Wynd & Mueller 572 appears to be an especially densely canescent form of V. ambrosifolia. The W. A. Weber 4588 and D. R. Goddard 650, distributed as V. ambrosifolia, are actually V. bipinnatifida; Deaver 3133 and Ensor 47 [111] are V. ciliata Benth.; J. W. Gillespie 8503 and Goodman & Hitchcock 1297 are V. gooddingii Briq.; while Sturgis s.n. [May 4, 1902] is V. wrightii.

Figure 2. Distribution of Verbena ambrosifolia in the United States

Mapping by county done by Andrew R. Moldenke



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QUERCUS XMEGALEIA LAUGHLIN

Hibrida nova

Quercus lyrata Walt. X macrocarpa Michx.

Kendall Laughlin (1890-)
165 Pine Ave., Chicago, Ill.

A tree 1.09 m. in diameter and 29 m. tall with slender spreading branches 2 m. and higher above the base and stout ascending limbs. Bark rather light gray and rather thin; lower portion shallowly ridged, upper portion nearly smooth and interrupted by narrow vertical cracks. Branchlets glabrate at the end of the season, angled, grayish orange brown with numerous white lenticels. Terminal winter buds 4 mm. long, 3 mm. wide, ovoid, broadly rounded at the apex, light brown, puberulous.

Leaf blades 10-20 cm. long, 4.5-13 cm. wide, firm, dull moderate yellow green on both sides, glabrous above, soft-pubescent beneath with a tomentose yellow midrib, obovate in peripheral outline, symmetrically and deeply divided into 4 or usually 5 pairs of lateral lobes tapering toward the apex (rarely three-lobed with a pair of broad divaricate upper lobes sometimes bilobulate), the third or fourth pair the longest and often bilobulate, separated by rounded sinuses about as wide as the lobes; base cuneate, apex lobulate.

Petioles .4-1.5 cm. long, slightly angled, pubescent or nearly glabrous late in the season.

Acorns 17-25 usually about 20 mm. long; cup cup-shaped, rather deeply impressed at the base, 14-18 mm. high, 25-33 mm. wide, covered with thick medium brown deltoid puberulous scales, overlapping, tuberculate and pointed or galeate at the base, shorter and thinner toward the rim and ending in a thin irregular edge; nut castaneous, puberulous, short-oblong, rather deeply impressed at the apex, which is eccentric in relation to the rim of the cup, about two-thirds enclosed in the cup; peduncle 11-22 mm. long.

QUERCUS XMEGALEIA Laughlin

Arbor 1.09 m. diametro et 29 m. alta cum gracilibus extendentibus ramis 2 m. altioribusque super basim et pinguibus ascendentibus membris. Cortex pallidior cinereus et tenuior; inferior leviter fastigatus, superior fere laevis et angustis ad perpendiculum directis rimis interruptus. Ramuli temporis fine glabrati, angulati, cinerei lutei brunnei numerosis albis lenticellis. Extremae hiemales gemmae 4 mm. longae, 3 mm. latae, ovoidae, in apice late rotundata, pallidae brunneae puberulentes.

Folia 10-20 cm. longa, 4.5-13 cm. lata, firma, in ambobus lateribus hebetia galbina, supra glabra, subtus leniter pubescentia tomentosa flava costa media, circumcurrente adumbratione obovata, concinne et alte divisa in 4 vel plerumque 5 lobos lateralis utroque latere fastigantis ad apicem (raro ter lobata lato divaricato superiore lobo utroque latere interdum bilobulato), tertios vel quartos longissimos et saepe bilobulatos, separatos rotundis sinibus circa tam latis quam lobi; base cuneata, apice lobulato.

Petioli .4-1.5 cm. longi, leviter angulati, pubescentes vel fere glabri sero tempore.

Glandes 17-25 plerumque circa 20 mm. longae; cupula poculoformis, in base altius impressa, 14-18 mm. alta, 25-33 mm. lata, tecta crassis brunneis triangulis puberulentibus squamis imbricatis, tuberculatis acutisque vel galeatis in base, brevioribus tenuioribusque ad marginem et finitis tenui inaequali margine; nux coloris castanae, puberulens, breviter oblonga, altius impressa in apice, qui est eccentros ad cupulae marginem, circa duobus-tertiis conclusa in cupula; pedunculus 11-22 mm. longus.

DISCUSSION

This newly discovered hybrid of the Overcup Oak lyrata Walt. and the Bur Oak macrocarpa Michx., which has an average diameter of 3 feet 7 inches, a circumference of 11 feet 3 inches and an estimated height of 96 feet, is located in a second growth area of the [1]Big Oak Tree State Park in Mississippi County, Missouri, about 225 feet north of the south border of Section 10 T23N R16E and about a quarter of a mile west of the southeast corner of the same section. It is on the south side of a truck trail and there is a Baldcypress 22 feet 8 inches in circumference, the largest tree in girth in Missouri, about eleven hundred feet to the east. This tree is one of the very few remnants of virgin timber in Section 10. This

tree, the A.F.A. champions Green and Pumpkin Ashes and a Cottonwood 17 feet 5 inches in circumference fork at some distance above the base and were passed over by the early timber cutters as unfit for cutting because there was plenty of straight timber.

The leaves of this tree are intermediate between the parent species. In lyrata the width of all the lobes is less than half the distance from the base to the apex of the blade. In macrocarpa the lobes are wider than the sinuses. In megaleia the lobes and sinuses are of about the same width. In one rare form the leaves resemble the Post Oak. The leaves of megaleia show some resemblance to bebbiana, but the principal lobe is larger. The bark is like the White Oak. In its general appearance megaleia shows a strong superficial resemblance to the White Oak. The White Oak is not found in this park and occurs but sparingly elsewhere in the county.

Megaleia's acorns are odd. The awnless cups are wider than the average of lyrata. Both ends are impressed, a character I have not observed in any species. The impressed and eccentric apex of the nut gives one the impression that the nut has shrunk and moved around in the cup. Actually the nut, which has a very hard shell 4 mm. thick, is firmly imbedded in and attached to the cup in its distorted position and cannot be moved.

That lyrata and macrocarpa are closely related is shown by their juxtaposition in a table of sequence of species. Nevertheless it is not surprising that a hybrid between the two has not previously been discovered because they rarely grow together.[2] Lyrata inhabits the floodplains of the Southern States. Macrocarpa inhabits savannas and codominates woods containing smaller species in the north central states.[3] Both occur in large numbers and reach prodigious size[4] in Miquoria, macrocarpa having acquired exceptional tolerance in competition with large Southern species in these bottoms.

The holotype will be deposited in the Royal Botanic Gardens, Kew, England, and an isotype will be deposited in the U.S. National Herbarium, Washington, D.C., by way of the U.S. Forest Service.

---

[1] One and one-half miles from the Mississippi River; described in PHYTOLOGIA 4:154-155.

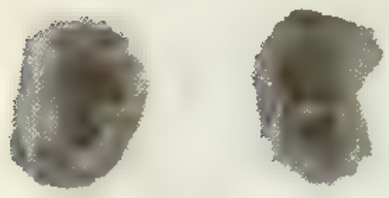
[2] The maps in Figures 18 and 19 on pages 14 and 15 of "Oaks (Eastern)" of the Forest Service, U.S. Department of Agriculture, Revised September 1959, are very instructive in showing the complementary (vicarious) ranges of these two species.

THE TYPE TREE OF QUERCUS XMEGALEIA

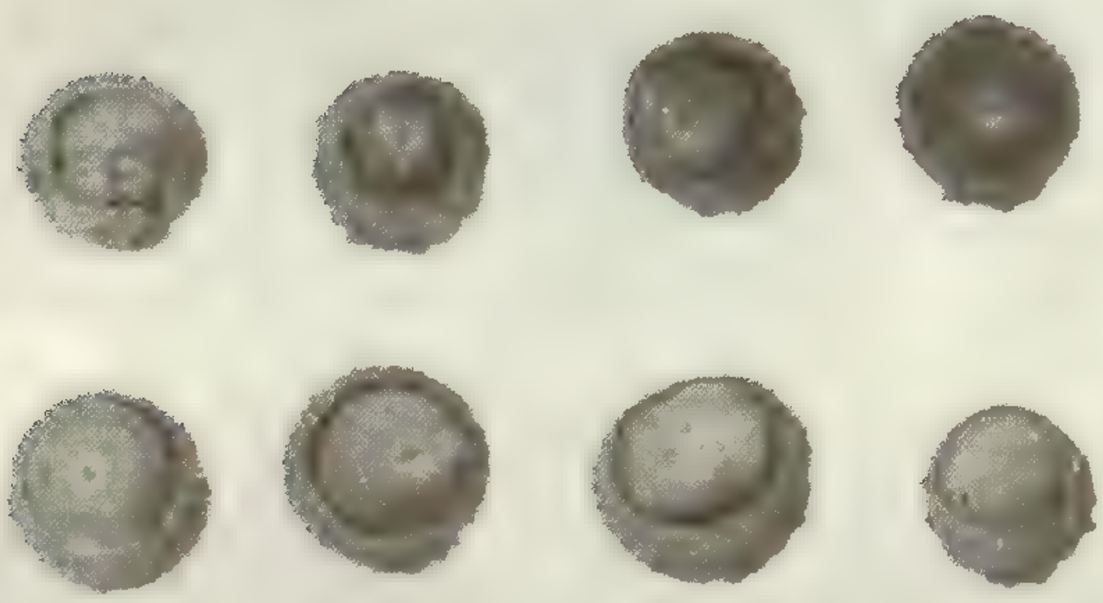
Seedlings in the foreground

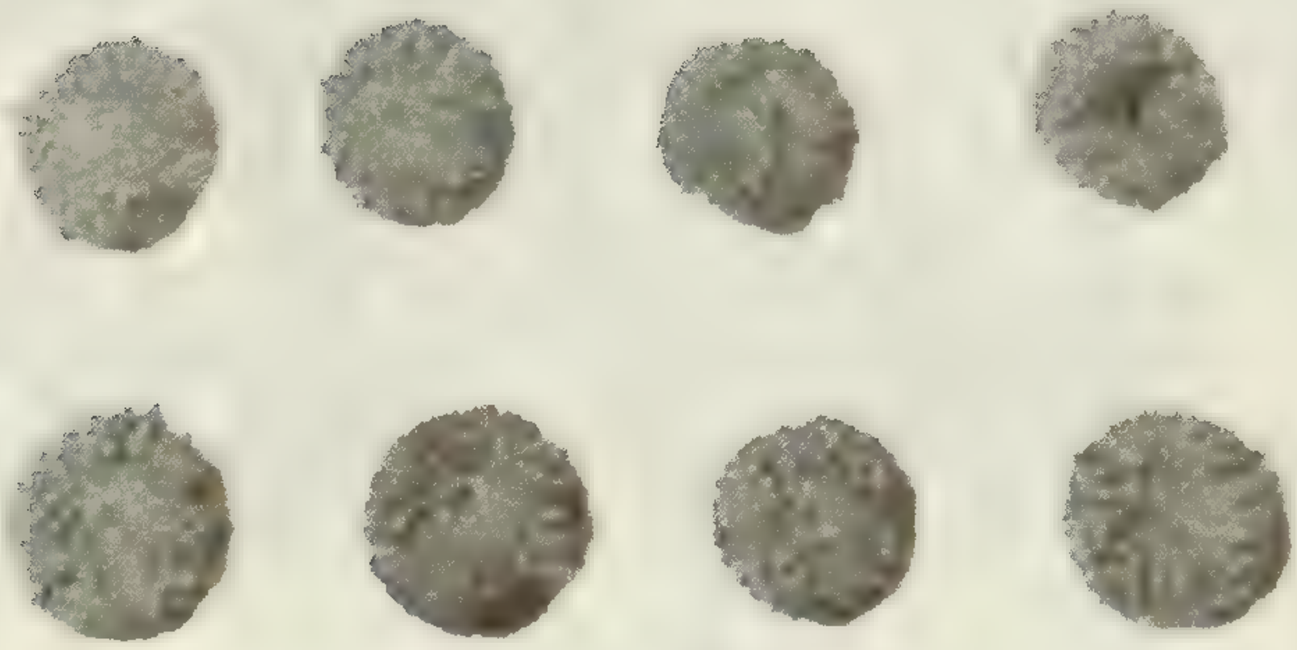
FOLIAGE OF QUERCUS XMEGALEIA

21% of natural size



Longitudinal Section of an Acorn





ACORNS OF QUERCUS XMEGALEIA

One-third of natural size

[3]See the table of dimensions on page 376 of Volume 6 of PHYTOLOGIA.

[4]"MIQUORIA" is a name coined by the author to take the place of "Big Oak Tree State Park," being brief, euphonious and descriptive. It is made up as follows: MI from Mississippi Co. and River; QU from Quercus; ORIA from Hicoria.

- - - - - - - - - - - - - - -

NOTES ON NEW AND NOTEWORTHY PLANTS. XXX

Harold N. Moldenke

CLERODENDRUM RAMOSISSIMUM var. BARBATUM Moldenke, var. nov.

Haec varietas a forma typica speciei calycibus dense patenteque hispido-barbatis recedit.

This variety differs from the typical form of the species in having the calyx densely hispid-barbate with white hairs spreading at right angles to the calyx.

The type of the variety was collected by Karl Rudolf Afzelius at Manosoa, in the province of Tulear, Madagascar, on January 10, 1913, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

CLERODENDRUM SUMATRANUM var. FAIRCHILDI Moldenke, var. nov.

Haec varietas a forma typica speciei petiolis laminisque glabris recedit.

This variety differs from the typical form of the species in having its petioles and leaf-blades glabrous.

The type of the variety was collected by David Fairchild (no. 488) — in whose honor it is named -- although first discovered by James Dorsett, near the trail from Baleeg to the Turpentine Still near Iakengon, Sumatra, on March 5, 1926, and is deposited in the herbarium of the University of California at Berkeley.

5-403

ERIOCAULON MINUSCULUM Moldenke, sp. nov.

Herba annua parvissima 1--2.3 cm. alta ubique glaberrima; foliis linearibus filiformibus 7--13 mm. longis; pedunculis solitariis rectis ca. 2 cm. longis 4-costatis non tortis; vaginis arcte adpressis ca. 1 cm. longis pellucidis ad apicem oblique fissis; capitulis solitariis nigris 1--3 mm. latis paucifloris.

Very small annual herb, 1--2.3 cm. tall, glabrous throughout; leaves linear-filiform, few, 7--13 mm. long, subulate at the apex, subpellucid; peduncles solitary, erect, about 2 cm. long, 4-costate, not twisted, stramineous; sheaths closely appressed to the peduncle, about 1 cm. long, pellucid, obliquely split at the apex, the lobes erect; heads solitary, black, 1--3 mm. wide, few-flowered, glabrous; involucral bractlets broadly obovate, shiny,

stramineous or brunnescent, about 1 mm. long and wide, rounded at the apex, completely glabrous, shiny.

The type of this very distinctive species for the region was collected by Harry Smith (no. 12123) in a swamp at Sunglingku, at about 3800 meters altitude, between Taining (Ngata) and Taofu (Dawo), Sikang, China, on September 13, 1934, and is deposited in the herbarium of the University of California at Berkeley. Floral dissections have not been made in order not to destroy the few good flower-heads on the type collection. The species cannot be mistaken for any other in the region.

LACHNOCAULON ANCEPS f. GLABRESCENS Moldenke, f. nov.

Haec forma a forma typica speciei pedunculis glabris vel glabrescentibus recedit.

This form differs from the typical form of the species in having its peduncles either glabrous from the beginning or else becoming glabrous, subglabrous, or glabrescent in age.

The type of the form was collected by Samuel Mills Tracy (no. 7586) at Braidentown (now called Bradenton), Manatee County, Florida, on July 23, 1901, and is deposited in the herbarium of the New York Botanical Garden. It was originally distributed as L. digynum Holm, later re-determined by Dr. J. K. Small as L. anceps (Walt.) Morong with a question. There is a possibility that it may represent a natural hybrid between L. anceps and L. glabrum Körn.

LANTANA CAMARA var. TERNATA Moldenke, var. nov.

Haec varietas a forma typica speciei foliis ternatis laminis densiuscule hirsutulis supra scabris subtus resinoso-glandulosis recedit.

This variety differs from the typical form of the species in having its leaves ternate and the blades more densely hirsutulous on both surfaces, scabrous above, and resinous-glandulose beneath.

The type of the variety was collected by Otto Emery Jennings (no. 458) on the beach at Siguanea City, Isle of Pines, Cuba, on May 21, 1910, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collector states that it is a low shrub.

LANTANA HIRTA f. TERNATA Moldenke, f. nov.

Haec forma a forma typiea speciei foliis ternatis plus elongatis recedit.

This form differs from the typical form of the species in having ternate leaves, at least on the main stems, and in having the leaf-blades thinner in texture, more elongate, lanceolate, 3--5.5 cm. long, and 1.5--2.5 cm. wide.

The type of the form was collected by Cornelius Herman Muller (no. 2686) on openly wooded or unwooded banks near Monterrey, in the municipality of Cañon Diente, Nuevo Leon, Mexico, on December 8, 1939, and is deposited in the herbarium of the University of California at Berkeley. The collector notes that it is an abund-

ant shrub 2 to 4 feet tall, with orange-yellow corollas.

LANTANA KINGI Moldenke, sp. nov.

Frutex; ramis ramulisque glabris obtuse tetragonis sulcatis; foliis ternatis; petiolis ca. 1 cm. longis glabris; laminis foliorum membranaceis ovatis utrinque glabris, ad apicem acutis, ad basin longe acuminatis; inflorescentiis quam foliis brevioribus; bracteis perconspicuis foliaceis.

Shrub; stems and branches apparently glabrous throughout, obtusely tetragonal, sulcate in drying, stramineous or brownish; nodes somewhat annulate; principal internodes 4--7.5 cm. long; leaves mostly ternate; petioles slender, about 1 cm. long, glabrous; leaf-blades membranous, somewhat lighter green beneath, ovate, 5--8 cm. long, 2.5--4 cm. wide, rather coarsely serrate from slightly below the widest part to the apex, acute at the apex, long-acuminate at the base, glabrous on both surfaces, often somewhat pustulate-scaly above; inflorescences opposite or ternate, shorter than the subtending leaves; peduncles slender, 3--4 cm. long, glabrate, brownish, ascending; heads densely many-flowered, hemispheric in anthesis, later somewhat elongate and loose; bractlets very numerous and conspicuous, foliaceous, 4--7 mm. long, 1--2 mm. wide, very minutely strigillose, irregularly spreading in fruit; corolla dark-orange, 4--5 mm. long, very minutely strigillose on the outside.

The type of this species was collected by Robert Merrill King (no. 1775) -- in whose honor it is named -- in clay loam in open sunshine along the Pan-American Highway (Route 190) 2 km. south of the village of Niltepec, altitude 50 meters or less, on the Isthmus of Tehuantepec, Oaxaca, Mexico, on July 17, 1959, and is deposited in the herbarium of the University of Texas at Austin. The collector states that the plant was common.

LANTANA PETITIANA var. SUBGLABRESCENS Moldenke, var. nov.

Haec varietas a forma typica speciei foliis majoribus subtus subglabrescentibus recedit.

This variety differs from the typical form of the species in having its leaves larger, to 4 cm. long and 2 cm. wide when mature and then subglabrescent beneath.

The type of the variety was collected by Peggy E. Ellis (no. 234) southwest of El Rago, at 6°35' N., 45°43' E., in the Ogaden, Ethiopia, at an altitude of 2500 feet, on November 25, 1953, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The collector notes that the plant is occasional in the medium or dense bush, not seen in open bush or gravel, and describes it as a woody herb, growing 3 feet tall, with weak stems, often growing under shrubs, the leaves very rough, and the flowers cream and pale-mauve in color.

LANTANA VELUTINA f. VIOLACEA Moldenke, f. nov.

Haec forma a forma typica speciei corollis violaceis recedit.

This form differs from the typical form of the species in having its corolla light-violet or light-purple in color, with a

yellow center.

The type of the form was collected by Thelton W. McCorcle and Chester M. Rowell, Jr. (no. 3481) on rocky soil in a ravine, at an altitude of 5800 feet, 4 miles west of Chilpancingo, Guerrero, Mexico, on June 16, 1953, and is deposited in the herbarium of the University of Michigan at Ann Arbor. The aspect of the foliage and inflorescences is exactly that of L. montevidensis (Spreng.) Briq., but the plant is described by the collectors as a tree 6 feet tall!

LEIOTHRIX ARGYRODERMA var. BREVIPES Moldenke, var. nov.

Haec varietas a forma typica speciei pedunculis 4—5 cm. longis recedit.

This variety differs from the typical form of the species in having its peduncles only 4—5 cm. long during anthesis.

The type of the variety was collected by Auguste François Marie Glaziou (no. 9000) on the campos of Itatiaia near a little house called "Bueno Rangel", Minas Gerais, Brazil, on November 20, 1876, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris.

LEIOTHRIX FLUMINENSIS var. PUBERULA Moldenke, var. nov.

Haec varietas a forma typica speciei foliis ubique minute puberulis recedit.

This variety differs from the typical form of the species in having the leaves minutely puberulent throughout.

The type of the variety was collected by Jean Baptiste Antoine Guillemin (no. 239), who states that it was very abundant among Gaylussacia plants at Restinga de Tocaia, Brazil, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris.

PAEPALANTHUS BALANSAE var. DENSIFLORUS Moldenke, var. nov.

Haec varietas a forma typica speciei capitulis densifloris globosis 1 cm. diam. recedit.

This variety differs from the typical form of the species in having its heads very densely many-flowered, completely globose and 1 cm. in diameter during anthesis, not compressed in drying.

The type of the variety was collected by R. Braga and R. Lange (no. 92) in a wet campo near Cerradinho, Serra dos Dourados, Paraná, Brazil, in October, 1958, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

PREMNA CUMINGIANA f. CORDATA Moldenke, f. nov.

Haec forma a forma typical speciei laminis foliorum ad basin valde cordatis recedit.

This variety differs from the typical form of the species in having its leaf-blades conspicuously and deeply cordate at the base.

The type of the variety was collected by Mary Knapp Clemens on Mount Apo, province of Davao, Mindanao, Philippine Islands, in

June, 1924, and is no. 15630 in the herbarium of the Philippine Bureau of Science, deposited in the Britton Herbarium at the New York Botanical Garden.

PREMNA INTERRUPTA var. SMITINANDI Moldenke, var. nov.

Haec varietas a forma typical speciei laminis foliorum supra velutinis subtus dense velutino-tomentosis recedit.

This variety differs from the typical form of the species in having its leaf-blades velutinous-pubescent on the upper surface and very densely velutinous-tomentose beneath.

The type of the variety was collected by Tem Smitinand -- in whose honor it is named -- and I. Alsterlund (no. 6783) on a rocky ridge at Doi Chiengdao, at an altutude of 1600 to 1800 m., Chiengmai, northern Thailand, on April 26, 1960, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. The plant is described as a common tree, 8--10 m. tall, with whitish flowers.

PREMNA PYRAMIDATA var. VITIENSIS Moldenke, var. nov.

Haec varietas a forma typica speciei laminis foliorum supra glabris subtus leviter puberulis recedit.

This variety differs from the typical form of the species in having its leaf-blades glabrous above and merely lightly puberulous beneath.

The type of the variety was collected by John Wynn Gillespie (no. 3400) in woods in the vicinity of Nasimu, 9 miles from Suva, at an altitude of 150 meters, in the province of Naitasiri, Viti Levu, Fiji Islands, on October 20, 1927, and is deposited in the herbarium of the University of California at Berkeley.

PREMNA SUBSCANDENS var. GLABRESCENS Moldenke, var. nov.

Haec varietas a forma typica speciei laminis foliorum glabrescentibus vel in venis principalibus parce breviterque pilosulis recedit.

This variety differs from the typical form of the species in having its leaf-blades glabrescent on both surfaces, mostly only minutely pilosulous on the larger veins.

The type of the variety was collected by Maximo Ramos and Gregorio E. Edaño at San Mariano, province of Isabela, at an altitude of 1000 feet, Luzon, Philippine Islands, on February 25, 1926, and is deposited in the herbarium of the University of California at Berkeley.

PREMNA WOODI Moldenke, sp. nov.

Frutex scandens; ramulis gracilibus fulvo-hispidis; foliis oppositis brevipetiolatis; laminis foliorum firme chartaceis oblongo-ovalibus brunnescentibus ad apicem breviter acuminatis, ad basin truncatis vel leviter retusis, marginibus crenato-dentatis, supra nitidis parcissime pilosis, subtus in venis dense pilosis; inflorescentiis terminalibus parvis multifloris.

Woody vine, to 3.3 m. long; stems to 7.5 cm. in diameter; branchlets very slender, the younger parts densely yellow- or

fulvous-hispid or -hirsute; principal internodes 3--4.5 cm. long; leaves decussate-opposite; petioles short, slender, 5--6 mm. long, densely yellow- or fulvous-hirsute; leaf-blades firmly chartaceous, brunnescent or nigrescent in drying, lighter beneath, shiny above, oblong-oval, widest at or slightly below the middle, 5--10 cm. long, 2.3--5 cm. wide, short-acuminate at the apex, crenate-dentate along almost the whole margins except at the very apex and base, truncate or shallowly retuse at the base, obscurely and very widely scattered-pilose or glabrescent above, densely pilose along most of the venation beneath with fulvous hairs; midrib slightly impressed above in drying, prominulous beneath; secondaries slender, about 5 per side, ascending, not much arcuate, slightly impressed above in drying, prominulous beneath; veinlet reticulation abundant, obscure above, rather conspicuous beneath; inflorescence terminal, many-flowered, small, 2--3 cm. long and wide; peduncles slender, 7--18 mm. long, densely fulvous hirsute; pedicels slender, 1--2 mm. long, rather densely short-pubescent or puberulent; prophylla linear, minute; calyx campanulate, nigrescent, about 1.5 mm. long and wide, irregularly labiate, densely puberulous; corolla-tube about 4 mm. long, the limb about 3 mm. wide.

The type of this species was collected by A. Mail (no. 12) at Tenganiph, British North Borneo, on August 27, 1926, distributed as D. D. Wood 2631 -- in whose honor it is named -- and is deposited in the herbarium of the University of California at Berkeley.

PAEPALANTHUS CHASEAE Moldenke, sp. nov.

Herba perennis parva; caule ut videtur radicante subterraneo lignoso crasso toto longitudine radicifero; radicibus numerosis brevibus; foliis graminoideis 1--2.5 cm. longis, 1--1.5 mm. latis, plusminusve rectis, ad apicem acute subulatis, utrinque ut videtur glabris nitidisque pilis longis albidis parcissimis ornatis; vaginis cylindraceis rectis 1 cm. longis adpressis glabris parcissime pilosisve; pedunculis solitariis vel paucis gracilibus 2--5 cm. longis tricostatis tortis glabris stramineis nitidis; capitulis hemisphaericis dense multifloris albis 5--7 mm. latis.

Small perennial herb; stems apparently elongate, creeping horizontally just beneath the surface of the soil, thick, woody, bearing a large number of short roots on its under surface; roots straight, unbranched, usually extending directly downwards; leaves numerous, radical, grass-like, uniformly bright-green on both surfaces, erect or somewhat spreading, 1--2.5 cm. long, 1--1.5 mm. wide, acute and subulate at the apex, entire, apparently glabrous and shiny on both surfaces, but actually bearing a very few, widely scattered, long, whitish hairs; sheath 1 cm. long, glabrous or sparcely pilose; involucral bractlets in many series, overlapping, nigrescent, puberulent.

Type, Agnes Chase 10358, in sand by tiny streamlet near open summit of Serra de San Antionio, Diamantina, Minas Gerais, Brazil, December 27-30, 1929, deposited in herb. University of Michigan.

CERTAMEN MELASTOMATACEIS VII.

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CHAETOLEPIS SANTAMARTENSIS Wurdack, sp. nov.

In indumento calyceque, C. microphyllae (Bonpl.) Miq. distanter affinis, sed cum foliis amplioribus 5-nervatis vel breviter 5-plinervatis, floribus amplioribus, petalis roseis.

Trichomata leviter barbellata. Rami cum petiolis laminarum venis primariis subtus dense strigosi vel longo-strigulosi. Petioli 1-2 mm; lamina 8-18 X 5-8 mm oblongo-elliptica apice basique rotundata rigidiuscula breviter (ad 2 mm) 5-plinervata nervulis obscuris, supra modice longo-strigulosa, subtus in superficie modice setulosa. Flores ad ramulorum apices 1-3-aggregati, cum bracteis foliaceis 2-4 involucrati; bracteae ad 8 mm longae ovato-oblongae, supra apicem versus strigulosae basim versus glabrae, subtus setulosae. Hypanthium 3-3.5 mm longum apicem versus glabrum ad basim extremum sparse vel modice strigulosum; calycis lobi cum pilis 1-3 alternantes 2 X 2.5 mm late ovati apice obtusi vel rotundati extus centraliter sparse strigulosi intus glabri ciliolati. Petala 9 X 8 mm obovata asymmetrice truncata ciliolata. Filamenta 5-6 mm longa; antherae 3-3.5 mm longae oblongae apice minute uniporosae, connectivo non prolongato sed dorsaliter leviter elevato. Stylus 8-9 mm longus; stigma punctiforme; ovarium 4-loculare apice dense setulosum.

Type Collection: J. Cuatrecasas & R. Romero Castañeda 24669 (holotype US 2325392), collected in subpáramos at "hoya del Río Donachuí near Col", southeastern slopes of Sierra Nevada da Santa Marta, Dept. Magdalena, Colombia, elev. 3070-3100 m, Oct. 9, 1959. "Tree 2 m. Leaves yellowish dark-green above, yellowish beneath. Petals lilac-violet. Anthers yellow".

C. microphylla has broadly ovate basally nerved leaf blades only 5-7 mm long, hypanthia 2 mm long, and yellow petals 3.5-4 mm long with a single apical seta. The anther form of C. santamartensis is like that of C. anisandra Naud. and C. loricarella Triana, with the barest suggestion of a basal connective appendage; both of these more-distant relatives are otherwise quite different.

CHAETOLEPIS PERIJENSIS Wurdack, sp. nov.

De omnibus speciebus non squamoso-pubescentibus differt foliis uninervatis.

Frutex viscosus 0.3-0.6 m altus; ramuli acute quadrangulares demum teretes cum petiolis hypanthiisque primum dense granuloso-furfuracei demum glabrati ad nodos non setulosi. Petioli 0.3-0.5 mm; lamina 7-11 X 1.5-2.2 mm anguste oblonga apice rotundata basi acuta rigida, supra et subtus dense resinoso-punctata ad margines obscure ciliolato-serrulata setulis appressis 0.1-0.2 mm longis caducis alioqui glabra. Flores in ramulis brevibus solitarii terminales 4-meri. Hypanthium (ad torum) 2.3 X 1.8 mm; calycis tubus 0.2 mm altus in sinibus unisetulosus setula 0.2 mm longa, lobis 1 mm longis triangularibus hebeti-acutis appresso-ciliolatis. Petala 4-4.3 X 2.4-2.8 mm elliptica apice late acuta et apiculata eciliata glabra. Stamina isomorphica glabra; filamenta 3.5-4.2 mm; antherarum thecae 2.1-2.3 mm anguste oblongae minute porosae, connectivo basi inconspicue (0.1-0.2 mm) prolongato simpliciter articulato. Stylus 7.5 X 0.2 mm glaber; stigma punctiforme; ovarium 4-loculare apice breviter 4-lobulatum et modice strigulosum setulis 0.2-0.4 mm longis; semina 0.6 X 0.4 mm cochleata laevia.

Type Collection: J. Cuatrecasas & R. Romero Castañeda 25118 (holotype US 2339465), collected in páramo between Cerro Venado and Cerro Avíon, Sierra de Perijá, Dept. Magdalena, Colombia, elev. 3270-3350 m, Nov. 8, 1959. "Leaves light green. Petals and stamens yellow."

Paratypes (both from Sierra de Perijá, Dept. Magdalena): Cuatrecasas & Romero Castañeda 25082, from Sabana Rubia, páramo east of Manaure, elev. 3000-3100 m; M. L. Grant 10870, from páramo 12 km east-northeast of Manaure 1 km from Venezuelan border, elev. 3000 m.

C. loricarella Tr., the only other species with 1-nerved leaf blades but with squamose pubescence, does not seem to be a very close relative. C. perijensis should be associated with C. alpina Naud., C. thymifolia Tr., C. cufodontisii Standl., and C. sessilis Pittier; these four species have setulose branch nodes, 3-nerved usually broader leaf blades, and much more prominent intercalycine setae 0.6-1.1 mm long.

MICONIA ARCHERI Wurdack, sp. nov.

Sect. Tamonea, M. kraenzlinii Cogn. affinis sed cum foliis supra margines versus sparse gracili-setulosis filamentis styloque basim versus sparse glanduloso-puberulis.

Frutex 1-2 m; rami teretes cum foliis subtus inflorescentiis bracteolis hypanthiisque densissime cum pilis patulis

stellato-plumosis plerumque 0.3-0.4 mm longis vestiti. Petioli 0.5-1.2 cm; lamina 5.5-11 X 1.5-4 cm elliptica apice breviter (0.4-1 cm) graditerque acuminata basi obtusi vel vix rotundata coriacea, supra primum sparse (praecipue marginem versus) gracili-setulosa (pilis i. s. flavidis ad 1 mm longis) et modice stellato-puberula demum glabrata et vix rugulosa, 5-nervata nervis secundariis supra inconspicue impressis subtus leviter elevatis et ca. 2 mm inter se distantibus nervulis subtus inconspicue reticulatis, ad margines denticulata dentibus acutis ca. 0.5 mm altis et ca. 2 mm inter se distantibus. Panicula 1.5-3 cm pedunculata 3-6 cm longa pyramidato-oblonga; flores plerumque 5-meri in ramis lateralibus 5-10 mm longis glomerati (plerumque in dichasiis) sessiles; bracteolae 2.5-4 X 0.5-1 mm lanceolatae tarde deciduae. Hypanthium (ad torum) 3.5 mm longum campanulatum; calycis tubus 1.5 mm altus extus et intus lobi interioresque densissime stellato-puberulus, lobis interioribus 0.5 mm altis late triangularibus vel oblatis apice obtusis vel rotundatis, dentibus exterioribus callosis non eminentibus per pilos occultis. Petala 6.5-7 X 3-3.5 mm obovato-oblonga apice asymmetrice emarginata extus modice stellulato-furfuracea ad margines retrorse stellulato-ciliolata intus glabra. Stamina in dimensionibus vix dimorphica in forma isomorphica; filamenta 6 vel 4.7 mm basim versus sparse glanduloso-puberula; antherarum thecae 5.3 vel 4.6 mm curvato-subulatae, connectivo basi 0.2-0.3 mm lato et cum setulis ca. 8-15 glandulosis 0.1 mm longis ornato. Stylus 7.5 X 0.4-0.6 mm basim versus sparse vel modice glanduloso-puberulus; stigma truncatum; ovarium 5-loculare 1/3 inferum apice conicum et in collum 0.6 mm altum modice strigulosum circum stylum protractum.

Type Collection: W. A. Archer 232 (holotype US 1541878), collected at Bello, Dept. Antioquia, Colombia, elev. 1500-1800 m, June 19, 1930.

Paratypes (all Dept. Antioquia): Archer 768, from Medellín, elev. 1500 m; Molina & Barkley 18An368, from Cerro El Volador east of Medellín, elev. 1600 m; Bro. Daniel 1223, without definite locality.

M. kraenzlinii has only stellulate hairs on the upper leaf surface, pinoid hairs with very short spicules on the lower leaf surface, a slightly smaller (ca. 4 mm long) hypanthium plus calyx tube, and glabrous filaments and style. Another probable (ex type photograph and description) relative is M. mollis Tr., with only stellate hairs on the upper leaf surface and much more prominent foliar teeth, as well as glabrous filaments, but apparently the same subulate anthers. Vegetatively, M. archeri resembles M. versicolor Naud., a

pleiostemonous species with somewhat more compact pubescence, shorter hypanthia, and oblong non-attenuate anthers. Asplund (in litt.) several years ago noted that M. stricta Cogn. is synonymous with M. versicolor. The Orinoco station cited for the Bonpland collection of M. versicolor is surely erroneous; such geographical errors are not uncommon in the Bonpland Melastomataceae (cf. Graffenrieda rotundifolia (Bonpl.) DC., Brachyotum ledifolium (Desr.) Tr. as treated by me, etc.)

MICONIA RHODANTHA Wurdack, sp. nov.

Sect. Amblyarrhena. M. annulatae Tr. distanter affinis sed cum foliis minoribus crassioribus pedicellis longioribus antheris brevioribus.

Frutex 1-3 m glaber; rami teretes nodis incrassatis. Petioli 0.5-1.2 cm; lamina 2.5-6 X 1.5-3 cm elliptica apice late acuta et apiculata basi late acuta vel obtusa rigide coriacea. supra nitida venis venulisque vix impressis, subtus opaca venis venulisque bene conspicuis reticulatisque, 3-5-nervata ad margines minute serrulata dentibus ca. 0.1 mm apiculatis. Panicula 3-6 cm longa diffusa; flores 5-meri; pedicelli 5-10 mm longi ad medium vel paulo supra medium articulati, bracteolis 4-5 X 0.4-0.7 mm lineari-oblongis apiculatis mox deciduis. Hypanthium (ad torum) 2.2-2.5 X 2.3-2.5 mm; calycis tubus 0.5 mm altus, lobis interioribus 1.5-1.7 mm altis ovato-oblongis apice rotundatis, dentibus exterioribus callosis mucronulatis ca. 0.1-0.2 mm eminentibus. Petala 4.5 X 4 mm suborbicularia cucullata apice vix emarginata inconspicue pruinosa ad margines cum glandulis sessilibus minutis dense obsita. Stamina isomorphica; filamenta ca. 2 mm longa glabra; antherarum thecae 1.2 X 0.7 mm oblongae crassae ventraliter paulo infra apicem uniporosae, connectivo densiuscule glanduloso-papilloso basi 0.3 mm prolongato dorsaliter vix elevato ventraliter inconspicue bilobulato. Stylus 2.7 X 0.5-0.6 mm glaber; stigma truncatum; ovarium 3-loculare 1/2 inferum apice in conum glabrum 0.9 mm altum protractum.

Type Collection: Bro. Daniel 1624 (holotype US 1744841), collected at Abejorral, Dept. Antioquia, Colombia, Aug. 1938. "Corolla red; fruit violet".

Paratypes (all Dept. Antioquia): Bro. Tomas 1517, from Yarumal; Metcalf & Cuatrecasas 30111, from between Valdivia and Yarumal, elev. 2000 m; Hodge 6876, Barkley & Johnson 252, both from vicinity of La Ceja, elev. 1800-2500 m.

While M. rhodantha shows the same branch node swellings as M. annulata and M. killipii Gleas., as well as the same general inflorescence type as M. alypifolia Naud. and M. livida Tr.,

the placement remains dubious. The anthers are rather like those of Sect. Chaenopleura, but not at all rimose. The leaf texture and venulation (but not the floral features) are reminiscent of that of M. cundinamarcensis Wurdack, while the hypanthium and petals are suggestive of the general affinity of M. compressicaulis Wurdack. From Gleason's photograph, M. nodosa Cogn. is somewhat similar vegetatively, but with pli-nerved leaves furfuraceous on the veins beneath and smaller sessile flowers.

MICONIA VALLENSIS Wurdack, sp. nov.

Sect. Cremanium. M. compressicauli Wurdack et M. gonio-cladae Tr. affinis sed cum floribus maioribus.

Fere glabra. Rami acute quadrangulares cum foliis inflorescentiisque primum minutissime furfuracei mox glabrati ad nodos inconspicue strigulosi. Petioli 4-5 mm longi compressi; lamina 3-5 X 1.5-3 cm anguste ovata apice acuta basi rotundata vel vix cordata rigida i. s. lutea, 5-nervata nervulis subtus inconspicue reticulatis, ad margines inconspicue denseque serrulata dentibus appressis ca. 1 mm inter se distantibus. Panicula 2.5-4 cm longa pauciflora; pedicelli 7-9 mm longi supra medium articulati, bracteolis 4-5 X 0.7-1 mm anguste oblongis acutis mox caducis; flores 5-meri. Hypanthium (ad torum) 3.8 mm longum glabrum; calycis tubus 0.5 mm altus, lobis interioribus 2.3 mm longis oblongo-ovatis rotundatis, dentibus exterioribus oblongo-triangularibus acutis lobos interiores 0.3 mm brevioribus. Petala 6.5 X 4.5-4.8 mm, suborbicularia cucullata apice vix retusa glabra. Stamina fere isomorphica glabra; filamenta 3 mm longa; antherarum thecae 1.9-2 X 1 mm obovato-oblongae late biporosae, connectivo non prolongato dorsaliter basi hebeti-tuberculato tuberculo 0.2 mm alto. Stylus 4.5 X 0.5 mm glaber; stigma truncatum; ovarium 4(?)-loculare 1/2 inferum apice libero 0.7 mm alto glabro.

Type Collection: J. Cuatrecasas 21667 (holotype US 2338750), collected at "La Palma, lado derecho del río Pichindé, hoya del río Cali, Cordillera Occidental, vertiente oriental", Dept. El Valle, Colombia, elev. 2500 m, Jul. 24, 1946. "Frutex erguido, 2 m alt. con ramificacion terminal. Hoja subcoriácea, verde semibrillante haz, verde amarillenta envés. Cáliz amarillo claro. Pétalos id. Frutos rojos, maduros negruzcos."

Both suggested relatives have hypanthia only about 2 mm long and petals 1.5-4.5 mm long. M. compressicaulis has compressed-alate stems, but similar leaves; M. gonioclada has similar quadrate branches but leaf serrations 3-4 mm apart. Cuatrecasas 21667 had been distributed as M. asclepiadea Tr., a

species of Sect. Amblyarrhena with sessile large thin leaves and calyx lobes at anthesis only 0.5-0.7 mm long.

MICONIA PURACENSIS Wurdack, sp. nov.

Sect. Cremanium. M. squamulosae (Sm.) Tr. affinis sed cum floribus breviter pedicellatis nutantibus hypanthiis sparse arachnoideo-furfuraceis non costatis staminum maiorum connectivo dorsaliter appendiculato.

Frutex 4-8 m; rami obscure rotundato-quadrangulares cum foliis subtus inflorescentiisque densissime cum indumento amorphico arachnoideo demum granuloso-floccoso fulvo appresso obsiti. Petioli 0.3-0.5 cm; lamina 2-3.5 X 1-1.8 cm elliptica apice late hebeti-acuta vel obtusa vix retusa basi late acuta rigida integra non ciliata, supra primum arachnoideo-furfuracea mox glabrata, trinervata nervis duobus primariis lateralibus ca. 1.5-2 mm inframarginalibus nervis secundariis supra creberrime impressis subtus non vel vix elevatis. Panicula 2-4 cm longa oblongo-pyramidata; flores 5-meri; pedicelli 1-2 mm longi crassi paulo supra medium articulati, bracteolis non visis. Hypanthium (ad torum) 1.9-2.2 X 2.5-2.6 mm urceolatum basim versus arachnoideo-pubescens apicem versus fere glabrum; calycis tubus 0.6 mm altus, lobis interioribus 0.3-0.4 mm altis obtusis basi remotis, dentibus exterioribus vix evolutis callosis lobos interiores aequantibus. Petala 1.8-1.9 X 2.3-2.4 mm suborbicularia apice vix emarginata modice granulosa. Stamina vix dimorphica glabra; filamenta 1.9-2 mm longa; antherarum thecae oblongae 1.1-1.3 X 0.7-0.8 mm apice late (0.4-0.5 mm) dorsaliterque biporosae. Stamina antesepala: connectivum ventraliter 0.5 mm prolongatum et vix bilobulatum dorsaliter cum appendice descendente truncata 0.8 X 0.6 mm armatum. Stamina intersepala: connectivum infra thecas ventraliter 0.5 mm prolongatum dorsaliter cum tuberculo 0.4 X 0.4-0.5 mm et 0.3 mm elevato hebeti armatum. Stylus 2-3 X 0.4-0.5 mm glaber; stigma truncatum; ovarium 2(?)-loculare 2/3 inferum glabrum apice in conum crassum 0.4 mm altum circum stylum protractum.

Type Collection: J. Cuatrecasas 23449 (holotype US 2338696; isotype F), collected at "filo de la Cordillera Central al N. del volcán Puracé, alrededores de la Laguna de San Rafael, páramo 3350 m alt.", Dept. Cauca, Colombia, Jan. 29, 1947. "Arbolito 4 m alt. Hoja coriácea, verde clara, brillante haz, ocrácea envés. Pétalos blancos."

Paratypes: Cauca: Cuatrecasas 14645 (F), from "páramo del Puracé al sur del Volcán en el filo de la Cordillera, San Francisco, 3450-3400 m alt., Cordillera Central", 23 Jul. 1943; H. Antonio C. 75 (F), from "Páramo de las Papas, elev. 3100-

3500 m", Jan. 1947. El Valle: Cuatrecasas 20340 (F, US), from "cabeceras del río Tuluá, Quebrada Las Vegas, páramo 3400-3500 m alt., Cordillera Central, vertiente occidental," 22 Mar. 1946.

While M. squamulosa has similar (albeit generally larger) foliage, its flowers are sessile and erect or patent, the hypanthium is densely granular-squamulose and usually basally 10-costate, and the anthers have connectives with latero-ventral lobes but no large dorsal appendage. The more distantly related M. ochracea Tr. has shortly acuminate denticulate leaf blades, glabrous hypanthia, and a capitellate stigma.

HETEROTRICHUM RACEMOSUM Wurdack, sp. nov.

De congeneribus differt inflorescentiis racemiformibus.

Frutex 2-4 m; rami primum rotundato-quadrangulares demum teretes petiolique dense persistenterque laxo-strigulosi pilis gracilibus fuscis vel rufo-fuscis ca. 0.5-1 mm longis. Petioli 1-2 cm; lamina 7-12 X 3.5-6 cm elliptico-ovata apice acuta basi rotundata tenuiter coriacea i. s. fusca, supra cum tuberculis conicis setiferis (setis incurvo-erectis ca. 1 mm longis) dense obsita, subtus vix foveolata et modice gracili-setulosa pilis 0.5-1 mm longis, 5- vel sub-7-nervata nervis secundariis supra impressis subtus vix elevatis ca. 2 mm inter se distantibus. Flores 6-meri sessiles in racemo 4-10 cm longo terminali dense appresso-setoso (pilis gracilibus 1.5-2 mm longis) per paria inserti; bracteae bracteolaeque 5-7 X 1-2 mm anguste oblongae vel oblongo-lanceolatae extus strigulosae intus glabrae persistentes. Hypanthium (ad torum) 3.5 X 2.5 mm calycis dentes exterioresque modice brevi-strigosum; calycis tubus 0.6 mm altus, lobis interioribus 1.2-1.5 mm longis anguste triangularibus apice rotundatis ad margines inconspicue ciliolatis alioqui glabris, dentibus exterioribus subulatis 2.5-3 mm eminentibus; torus densiuscule glanduloso-setulosus pilis ca. 0.3 mm longis. Petala alba 7.5-8.5 X 4-4.5 mm obovato-oblonga apice truncata vel vix emarginata glabra non ciliata. Stamina dimorphica glabra, filamentis 5.9-6.1 vel 5.2-5.5 mm, connectivo ad filamenti insertionem dorsaliter inconspicue tuberculato. Stamina maiora: antherarum thecae 5.5 mm longae subulatae arcuatae basi ventraliter cum connectivo coalitae et 0.6 mm prolongatae, connectivo ventraliter bilobato lobis 0.6-0.8 mm longis acutis. Stamina minora: antherarum thecae 3.6-3.8 mm longae vix curvatae basi ventraliter cum connectivo coalitae et prolongatae, connectivo basi ventraliter ad apicem vix bilobulato lobis acutis 0.1 mm longis. Stylus 6 X 0.4-0.5 mm glaber; stigma vix clavato-expansum 0.9 mm diam.; ovarium 6-loculare

1/4-1/3 inferum vix 12-sulcatum sparse glanduloso-strigulosum apice in collum 0.6 mm altum glanduloso-ciliolatum protractum.

Type Collection: H. Pittier & M. Nakichenovich 15469 (holotype US 1933753; isotype VEN), collected at "alturas de Las Vueltas, fila de Rancho Grande", Parque Nacional Henri Pittier, Edo. Aragua, Venezuela, elev. 1500 m, July, 1947.

Paratypes (all Edo. Aragua): T. Garcia 72 (VEN), from El Paraiso, Rancho Grande; Foldats 2347 (VEN), from Cumbre Choroní; F. Fernandez 101 (US), from "cumbre, carretera Maracay-Choroní", elev. 1775 m.

All other described species of Heterotrichum have cymose or cymose-paniculate inflorescences. Vegetatively, the Aragua endemic resembles H. rostratum (Naud.) Gleas., which has cordate leaves and 8-merous flowers with very short external calyx teeth, as well as ventrally exappendiculate anthers. Among the eglandular species, H. racemosum resembles in external calyx teeth H. strigosum Tr. (with plinerved leaves), H. macrodon Planch. (with much larger flowers and exappendiculate anthers), and H. lucidum Tr. The latter species is probably the closest relative, having ventrally appendaged stamens but capitate-cymose inflorescences and 7-9(-11)-nerved leaves with only inconspicuously tuberculate upper surfaces.

CLIDEMIA AGUACLARENSIS Wurdack, sp. nov.

C. coronatae Gleas. affinis sed cum foliis vix cordatis pedicellis paulo infra hypanthium insertis.

Rami teretes dichotomi cum petiolis foliorum veris principalibus subtus inflorescentiis hypanthiisque modice stellulato-puberuli demum glabrati. Petioli 1-2.5 cm unilateraliter setulosi pilis muriculatis ad 1 mm longis; lamina 6-12 X 2.5-5 cm anguste ovata apice graditer angusteque hebeti-acuta basi vix (3-5 mm) cordata membranacea 7- vel sub-9-nervata nervulis laxe reticulatis, supra primum sparse stellulato-furfuracea demum glabrata, subtus in nervis primariis sparse setulosa pilis gracilibus laevibus ad 1 mm longis in superficie glabra, ad margines inconspicue undulato-denticulata dentibus setulosis setis appressis ca. 0.3 mm longis. Inflorescentia diffusa in ramorum axillis e basi 3-5-ramosa, ramis divaricatis ad 7 cm longis primum sparsissime setulosis setulis mox deciduis. Flores 5-meri; pedicelli 1-2.5 mm longi ad medium vel paulo supra plerumque articulati, bracteolis 0.5-1 mm longis linearibus vel oblanceolatis mox deciduis. Hypanthium (ad torum) 1.1 mm longum; calycis tubus 0.2 mm altus, lobis interioribus 0.3 X 0.9 mm oblatis vel triangularibus, dentibus exterioribus callosis non eminentibus; torus sparse setulosus.

Petala 1.7-1.8 X 1.1-1.3 mm oblongo-obovata apice rotundata glabra. Stamina fere isomorphica glabra; filamenta 1.1-1.2 mm; antherarum thecae 0.6 vel 0.8-0.9 mm longae crasse oblongae apice ca. 0.4 mm latae et minute (0.1 mm) uniporosae, connectivo non prolongato dorsaliter basi inconspicue (0.1 mm) hebeti-tuberculato. Stylus 3.1 X 0.25 mm glaber; stigma truncatum; ovarium 3-loculare 2/3 inferum, apice conico 0.2 mm alto sparse cum glandulis minutis clavatis obsito.

Type Collection: J. Cuatrecasas 22067 (holotype US 2338667; isotype F), collected "cerca del puente de Aguaclara, hoya del río Anchicayá, Cordillera Occidental, vertiente occidental", Dept. El Valle, Colombia, elev. 120 m, Sept. 29, 1946. "Sufrutex robusto, 1 m alt. Ramas divaricadas, densas. Hoja cartácea, verde oscura haz, verde pálida envés. Pétalos blancos. Anteras amarillas."

The Costa Rican relative has basally broadly acute leaf blades with patent-ciliate (hairs 1-1.5 mm long) margins, inflorescence branches only 3 cm long, and bracteoles inserted at the hypanthium base. C. diffusa Donn. Sm. is more distantly related, having purple-setose branchlets and lacking stellulate hairs. The inflorescences of the three species (as also in the next-described species) are actually terminal, becoming pseudolateral by dichotomized branch overgrowth. The general aspect of C. aguaclarensis is rather like that of the two 4-merous species, C. purpureo-violacea Cogn. and C. ramiflora Gleas., as well as several species of Ossaea.

CLIDEMIA DIGUENSIS Wurdack, sp. nov.

C. aguaclarensi Wurdack affinis sed cum ramis inflorescentiis hypanthiisque dense setulosis, ovario setuloso.

Rami teretes cum petiolis foliorum venis subtus inflorescentiis hypanthiisque modice vel dense setulosi (pilis 0.5-1 mm longis) et modice caduceque stellulato-puberuli. Petioli 0.7-2.5 cm; lamina 5.5-14 X 2.5-9.5 cm anguste ovata vel ovata apice anguste hebeti-acuta basi vix (3-7 mm) cordata rigide membranacea, supra glabra venis venulisque creberrime impressis, subtus in venulis sparse setulosa in superficie glabra, 7-9-nervata ad margines appresso-ciliolata. Inflorescentia hypanthiumque pilis exceptis ut in C. aguaclarensi. Petala 1.3 X 1.1 mm obovata rotundata glabra. Stamina fere isomorphica; filamenta 1.2-1.3 mm glabra; antherarum thecae 0.8-0.9 mm longae crasse oblongae poro 0.15 mm diam., connectivo non prolongato dorsaliter 0.05 vel 0.15 mm calcarato. Stylus 3.4 X 0.25 mm glaber; stigma truncatum; ovarium 3-loculare 2/3-3/4 inferum apice conico sparse cum glandulis minutis clavatis et circum styli basim sparse cum setulis

ornato.

Type Collection: J. Cuatrecasas 23742 (holotype US 2338702; isotype F), collected in "quebradita del km. 51, lado izquierdo del río San Juan en la región de Queremal, hoya del río Digua, Cordillera Occidental, vertiente occidental", Dept. El Valle, Colombia, elev. 1540-1650 m, Feb. 25, 1947. "Frutex de ramas bejucosas. Hoja rugosa, verde grisáceo mate haz, verde claro brillante envés. Ramas de la inflorescencia violáceas. Pétalos blancos. Anteras amarillas."

Despite the marked pubescence disparity, C. diguensis seems to be merely a higher-elevation version of C. aguaclarensis. In Costa Rica, C. reitziana Cogn. & Gl. ex Gl. and C. coronata Gl. are a similar pair of vicariads, with however the reverse altitude-pubescence relation.

CLIDEMIA FAUSTA Wurdack, sp. nov.

Sect. Sagraea. C. donnell-smithii Cogn. distanter affinis sed cum foliis minoribus sessilibus glabris hypanthii pilis petalisque brevioribus.

Rami teretes foliaque glabri. Folia sessilia vel vix (ad 1 mm) petiolata; lamina 3-7 X 1.5-3 cm subcoriacea apice longe (1-2 cm) graditer angusteque acuminata basi vix (ad 2 mm) cordata 5-nervata nervis secundariis non vel indistincte evolutis ad margines inconspicue serrulata dentibus ca. 2 mm inter se distantibus. Cymae in foliorum axillis plerumque e basin trifurcatae 3-5-florae, pedunculo ad 7 mm longo cum pedicellis bracteolisque sparse setuloso; pedicelli 1.5-2 mm longi ad medium bibracteolati, bracteolis 1 mm longis linearibus persistentibus; flores 4-meri. Hypanthium (ad torum) 1.9 mm longum dense setulosum setulis simplicibus 0.8-1.3 mm longis; calycis tubus 0.2 mm altus, lobis interioribus 0.3 mm longis apice rotundatis, dentibus exterioribus 3.3-3.7 mm eminentibus linearibus anguste acutis sparse setulosis; torus glaber. Petala 2.3-2.5 X 0.9 mm oblonga apice rotundata glabra. Stamina isomorphica glabra; filamenta 1.3 mm longa; antherarum thecae 0.9 mm longae oblongae minute (0.1 mm) uniporosae, connectivo non prolongato non appendiculato. Stylus 3.4 X 0.2 mm glaber; stigma truncatum; ovarium 4-loculare omnino inferum glabrum.

Type Collection: J. Cuatrecasas 19987 (holotype US 2338664), collected at "quebrada de Aguadulce, Bahía de Buenaventura, Costa del Pacífico," Dept. El Valle, Colombia, elev. 0-10 m, Feb. 24, 1946. "Fruticuletum epífito de ramas

colgantes. Hoja verde clara. Cáliz verde claro. Pétalos blancos. Filamentos blancos. Anteras rojizas."

Vegetatively, the suggested Guatemalan relative, with its setose branchlets and larger petiolate strigose leaves, does not resemble C. fausta; however, the floral structure is quite similar, apart from the relatively shorter external calyx teeth and larger (3.7 X 1.1 mm) petals. The general vegetative aspect of the Buenaventura ("lucky") species is rather like that of Mouriri parvifolia Benth., while the inflorescence and long sepals recall Ossaea.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. III

Harold N. Moldenke

VERBENA L.

Additional & emended literature: Brunfels, Herb. Viv. Icon. 1: 119--120. 1532; Fuchs, Hist. Plant. Basil. 592--593. 1542; Ruel, Ped. Dioscor. Anazarb., ed. 1, 317.(1547) and ed. 2, 519--521. 1551; Tragus, Stirp. 210. 1552; Gesner, Collect. Stirp. 113. 1553; Matth., Comment. 466--467. 1554; Cordus, Op. Posth. 66. 1561; Matth., Disc. Ped. Dioscor. Anazarb. 1106--1108. 1568; Caesalp., De Plant. 450--451. 1583; Dalech., Hist. Gen. Pl. 237. 1587; Lobel, Icon. Stirp. 534--535. 1587; Tabern., Icon. Plant. 132. 1590; Gerarde, Herbal 580--582. 1597; Clus., Rar. Plant. Hist. 4: xlv--xlvi. 1601; Dodon., Pe,pt. 125, 150, & 250. 1616; Matth., Op. Omn. Comment. 741--742. 1624; J. Parkinson, Theat. Bot. 675. 1640; J. Bauhin, Hist. Plant. Univ., ed. 1, 3:443--444. 1651; Bont., Hist. Nat. Ind. Orient. 150. 1658; K. Bauhin, Pinax Theatr. Bot., ed. 2, 269. 1671; K. Bauhin, Prodr. Theatr. Bot. 125. 1671; Imperato, Hist. Nat. 673--674. 1672; Matth., Apolog. 174 & 214. 1674; Zanoni, Hist. Bot. 203. 1675; Ray, Hist. Plant. 535--536. 1686; P. Hermann, Hort. Acad. Lugd.-Bat. Cat. 699. 1687; J. Bauhin, Hist. Plant. Eur. 2: 494. 1689; Breyn, Prodr. Fasc. Rar. Pl., ed. 1, 2: 100--102. 1689; Riv., Introd. Gen. Remherb. [24], Icon. [56 & 57]. 1690; Riv., Ord. Pl. Irreg. Monop. 81. 1690; Pluk., Phyt. 327, fig. 7. 1692; Petiv., Mus. Petiv. 60. 1695; Pluk., Almag. Bot. 283 & 382, pl. 321, fig. 1. 1696; Sloane, Cat. Pl. Jamaic. 64. 1696; Magn., Hort. Reg. Monsp. 203. 1697; P. Hermann, Parad. Bot., ed. 1, 242, pl. 242. 1698; Tourn., Inst. Rei Herb. 200. 1700; Commel., Hort. Med. Amstel. 2: 223. 1701; Plum., Nov. Plant. Am. Gen. 6. 1703; Ray, Hist. Plant. 3: Suppl. 285--288 & App. 249. 1704; P. Hermann, Parad. Bot., ed. 2, 242, pl. 242. 1705; Sloane, Hist. Nat. Jamaic. 1: 171, pl. 107, fig. 1. 1707; Boerh., Ind. Pl. Hort. Lugd. 1: 187. 1710; Munting, Phytograph. Cur. 784. 1711; Barr., Pl. Gall. Hisp. 30, pl. 1146. 1714; Vaill., Serm. Struct. Flor. 49. 1718; Boerh., Ind. Alt. Plant. Hort. Act. Lugd. 1: 186--187. 1727; P. Hermann, Thes.

Zeyl. 228. 1737; L., Hort. Cliff. 10—11. 1737; Breyn, Prodr. Fasc. Rar. Pl., ed. 2, 2: 100. 1739; J. F. Gronov., Fl. Virg., ed. 1, 1: 7—8. 1739; A. Royen, Fl. Leyd. Prod. 326—327 & 530. 1740; A. Haller, Enum. Meth. Stirp. Helvet. 1: 551, 624, 634, 660, 661, 709, & 794. 1742; Barrel., Plant. Gall. 30, pl. 855 & 1146. 1744; L., Fl. Suec., ed. 1, 9. 1745; L., Fl. Zeyl. 399. 1747; Dalibard, Fl. Paris. 9. 1749; L., Mat. Med. 6, 208, & 218. 1749; Blackwell, Cur. Herbal 1: pl. 41. 1751; Sauvages, Meth. Fol. Pl. Fl. Monspel. 145, 248, 279, & 342. 1751; L., Sp. Pl., ed. 1, 1: 18—21 & 342 (1753) and 2: 601, 630, 660, 878, & 879. 1753; L., Fl. Suec., ed. 2, 10. 1755; Kniphof, Bot. Orig. Herb. Viv. pl. [284]. 1757; Dodart, Mem. Serv. l'Hist. Pl., ed. 3, 627, pl. 35. 1758; J. F. Gronov., Fl. Virg., ed. 2, 4, 92, & 146. 1762; A. Haller, Stirp. Indig. Helvet. 1: 96—97. 1768; J. A. Murr. in L., Syst. Veg., ed. 13, 61—62. 1774; Sabbat in Martelli, Hort. Roman. 3: 10—11, pl. 54—56. 1775; Oeder, Fl. Dan. 4: pl. 628. 1775; O. F. Müll., Icon. Plant. Fl. Dan. 4: 5, pl. 628. 1777; Hoffm., Deutsch. Fl. 9, pl. 2. 1791; Desf., Fl. Atlant. 1: 15—17. 1800; Lam. & DC., Fl. Franç. 3: 502—503. 1805; Poir. in Lam., Encycl. Méth. Bot. 8: 544—551. 1808; H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 272—277. 1818; Hook., Bot. Misc. 2: 166. 1831; Cabrera, Bol. Argent. Bot. 1: 67. 1945.

An additional abbreviation employed herein is Ws = University of Wisconsin, Madison, Wisconsin.

The Peñalosa 871 distributed as "Verbena sp." is actually Bouchea prismatica var. brevirostra Grenz.

Additional excluded species are:

Verbena amer. frutescens teucrii foliis & facie, floribus caeruleo-purpurascentibus amplissimis Breyn = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena asparagoïdes Gill. & Hook. = Junellia asparagoides (Gill. & Hook.) Moldenke

Verbena caroliniana, erecta, foliis oblongo-obovalibus, obtusis; spicis filiformibus, longissimis, distinctifloris Michx. = Stylodon carneus (Medic.) Moldenke

Verbena connatibracteata var. glabrior Skottsberg = Junellia juniperina (Lag.) Moldenke

Verbena erioclona Schau. = Callicarpa erioclona Schau.

Verbena fruticosa Houst. = Phyla nodiflora var. reptans (H.B.K.) Moldenke, in part, & P. strigulosa (Mart. & Gal.) Moldenke, in part

Verbena fruticosa Mill. = Phyla nodiflora var. reptans (H.B.K.) Moldenke, in part, & P. strigulosa (Mart. & Gal.) Moldenke, in part

Verbena mas Fuchs = Erysimum officinale L., Brassicaceae

Verbena mexicana trachelii folio, fructu aparines Dill. = Priva mexicana (L.) Pers.

Verbena nodiflora Matth. = Phyla nodiflora (L.) Greene

Verbena nodiflora curassavica foliis menthae Morison = Ghinia

curassavica (L.) Millsp.
Verbena nodiflora foliis minoribus viridibus Moris. = Phyla nodiflora (L.) Greene
Verbena orubica teucrii folio, primulae veris flore, siliquis & seminibus longissimis; caudo muris vulgo Parkins. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena racemo simplicissimo, floribus sessilibus, calycibus fructus reflexis racemoque appressis Gronov. = Phryma leptostachya L., Phrymaceae
Verbena selaginoides Kunth = Junellia selaginoides (Kunth) Moldenke
Verbena spathulata var. pseudojuncea Remy = Junellia pseudojuncea (C. Gay) Moldenke
Verbena thymifolia Cav. = Junellia thymifolia (Lag.) Moldenke

VERBENA ABRAMSI Moldenke
Additional citations: CALIFORNIA: County undetermined: Newlon 271 [Alexander Valley] (Ws).

VERBENA AMBROSIFOLIA Rydb.
Additional literature: Daniels, Fl. Boulder Colo. 204. 1911.
Waterfall found V. ambrosifolia in Mexico on flat mountaintops with acacias and on stony flats with acacias, mimosas, and cacti, while Wynd & Mueller found it in moist places on deserts. The Cory 53507 and Wynd & Mueller 450, distributed as V. ambrosifolia, are actually V. bipinnatifida Nutt.
On the other hand, herbarium material of V. ambrosifolia has been misidentified and distributed as V. ambrosifolia f. eglandulosa Perry, V. aubletia L., V. bipinnatifida Michx., V. bipinnatifida Nutt., V. bipinnatifida var. latifolia Perry, V. bipinnatifida var. latiloba Perry, V. bipinnatifida var. latilobata Perry, V. bracteosa Michx., V. canadensis (L.) Britton, V. ciliata Benth., V. gooddingii Briq., V. pinnatifida Nutt., V. racemosa Eggert, and V. wrightii A. Gray.
The only recorded common names are "moradilla", "ragweed-leaved vervain", "verbena", and "western pink verbena", but, according to Wyman & Harris, in the Navajo language a form-genus name for verbenas, of which this is the common representative in the area, is "ʔaze.ʔbilátah ɬičí.ʔígí", while the arthritis medicine made from this plant is called "čo.yinʔaze.ʔ".
The Whitehouse 8741 collection cited below may actually have been collected in Santa Fé County -- its label merely says "Las Vegas -- Santa Fé"; while Whitehouse s.n. [9.3.1929] may have come from San Miguel County -- its label merely says "Santa Rosa -- Las Vegas".
Miss Perry, in her monograph of the North American species of this genus, cites the following 64 additional specimens not as yet examined by me: COLORADO: Denver Co.: E. C. Smith s.n. [South Denver, 8 June 1891] (E). Fremont Co.: T. S. Brandegee s.n. [Canon

City, May 1871] (E). Otero Co.: Osterhout s.n. [Rocky Ford, June 8, 1900] (G--isotype); Rose & Fitch 17504 (E, W). Pueblo Co.: Greene 45 (G); E. L. Johnston 986 (E). County undetermined: Osterhout 3165 [New Windsor] (G). OKLAHOMA: Cimarron Co.: G. W. Stevens 484 (E, G). TEXAS: Hudspeth Co.: Ferris & Duncan 2474 (E); Orcutt 6096 (E), 6197 (E). Presidio Co.: Eggert s.n. [near Marfa, 14 May 1901] (E). Val Verde Co.: Moore & Steyermark 3009 (E). County undetermined: Moore & Steyermark 3622 [McKittrick Canyon] (E). NEW MEXICO: Bernalillo Co.: E. J. Palmer 31192 (E); Rose & Fitch 17801 (E, W). Colfax Co.: Mathias 545 (E). Dona Ana Co.: Wooton 642 (E, W), s.n. [Organ Mountains, 16 Aug. 1893] (E). Eddy Co.: Wooton s.n. [Queen, 2 Aug. 1909] (E, W). Grant Co.: O. B. Metcalfe 1231 (E). Lincoln Co.: Earle & Earle 236 (E, Po); Wooton 363 (E, G). Quay Co.: G. L. Fisher s.n. [Nara Visa, 21 April 1911] (E). Rio Arriba Co.: Eggleston 6644 (W). Sandoval Co.: Arsène & Benedict 16306 (E). San Miguel Co.: Anect 100 (G), 143 (G); P. C. Standley 4951 (E, F, G, W). Santa Fe Co.: Engelmann s.n. [about Santa Fe, 8--9 Sept. 1881] (E); Wislizenus 525 (E). Socorro Co.: Vasey s.n. [Socorro, May 1881] (E, F, W). Taos Co.: Wooton s.n. [near Fairview, 18 July 1904] (W). County undetermined: Fendler 586 (D, E, F, G, W); Griffiths 4244 [South Spring] (W). ARIZONA: Coconino Co.: Edw. Palmer s.n. [Little Colorado, 1869] (W). Navajo Co.: L. F. Ward s.n. [June 17, 1901] (W). Pima Co.: Mearns 2677 (E, W). MEXICO: Chihuahua: Stearns 104 (W). Coahuila: E. W. Nelson 6789 (W); Edw. Palmer 1050 [Saltillo] (G); Pringle 3467 (F), 13157 (F, G, W). Nuevo Leon: Edw. Palmer 1050 [Monterey] (E, W). It should be noted that she cites Fendler 586 as "in part" this species, but does not cite this number for any other species of the genus in her alphabetic list of citations. She regards Visher 2132 as V. bipinnatifida.

In all, 351 herbarium specimens, including the types of all the names involved, have been examined by me.

Citations: SOUTH DAKOTA: Washabaugh Co.: Visher 2132 (N). KANSAS: Douglas Co.: Yuncker & Welch 4019 (Dp). Neosho Co.: J. E. Miller s.n. [May 1888] (Cm). ARKANSAS: Izard Co.: Demaree 17004 (N). COLORADO: Adams Co.: N. K. Berg 4185 (Fc, N); J. M. Grant s.n. [Quinby] (Se--28358). Archuleta Co.: Ferril s.n. [May 31, 1902] (Bl--42243); Weber & Livingston 6258 (Gg--381245). Baca Co.: W. A. Weber 3286 (Au--121563, Gg--370473, N). Boulder Co.: Ewan 11188 (En); H. C. Hanson s.n. [Boulder, June 28, 1920] (N); J. R. MacFarlane s.n. [1881] (Bl--42276); Penard 348 (C); Ramaley 15322 (Au, Bl--42365, Gg--267607, Mn--32466); Tweedy 5125 (N); A. G. Vestal s.n. [June 11, 1913] (Du--143286), s.n. [June 23, 1913] (Du--143577). Denver Co.: Eastwood 140 (Bl--42239, Bl--42241, Ca--148188, Gg--31293), s.n. [Denver, June 1885] (Bl--42246), s.n. [Denver, July 1892] (Du--24170, N), s.n.

[in the mts., July] (Bl--42242); Ferril s.n. [May 13, 1902] (Bl--42240). El Paso Co.: H. Hapeman s.n. [Colorado Springs, July 4, 1920] (Hp); M. E. Jones 122 (Br, Du--151798, Go, Po--71144, Ua--11391, Ua--11392), s.n. [Colorado Springs, May 1878] (Bl--42277); F. D. Kelsey s.n. [May 1878] (Ob--50860); Ownbey 718 (Pl--98766); Schmoll 1548 (Bl--42275). Fremont Co.: T. S. Brandegee 5 (Ca--177631), s.n. [Canon City, Apl.-May 1871] (Pr), s.n. [Canon City, 1877] (Ca--169645); J. H. Ehlers 7516 (Mi, Mi); A. Nelson 10548 (Ca--500825, Du--252578, Mg--37, Mn--20027, N, Po--190666, S); Osterhout s.n. [June 22, 1926] (Po--113732); Penland 1209 (Gg--282077); Redfield 521 (Pr). Gilpin Co.: Scovell s.n. [Central City, 1869] (Mi). Huerfano Co.: Shear 4760 (N); Stigall s.n. [6/16/34] (Bl--42244). Jefferson Co.: J. H. Ehlers 8367 (Bl--42300); Huestis s.n. [Morrison, June 10, 1905] (Bl--42282); Zobel s.n. Deer Creek, May 25, 1934] (Gg--220518). Larimer Co.: J. H. Cowen s.n. [Herb. State Agr. Coll. Colo. 545] (Fc); Crandall s.n. [June 23, 1896] (Fc), s.n. [June 27, 1896] (N). Las Animas Co.: Archibald A.255 (Bl--42356); Beckwith 139 (N), 162 (Du--123523); Eastwood 5568 (Gg--31288); Ewan 12954 (En); C. M. Rogers 6015 (Au--121564). Otero Co.: Huestis s.n. [June 17, 1904] (Bl--42283); Osterhout s.n. [Rocky Ford, June 8, 1900] (N--type); L. Paull 3 (Bl--42245), 58 (Bl--42270); Rose & Fitch 17504 (N). Pueblo Co.: J. H. Ehlers 6805 (Mi, Mi), 6814 (Mi); Ewan 11995 (En), 14157 (Bl--53188, En); Hicks & Hicks s.n. [Pueblo, 6-8-90] (Dt, Ob--97282); W. W. Robbins 5011 (Bl--42357, Bl--42367); R. C. Rollins 1209 (N); Rydberg & Vreeland 5676 (N); Skjøt-Pedersen 1220 (Cp); Waterfall 10858 (St). Weld Co.: Osterhout s.n. [May 27, 1908] (Du--91153); Ramaley 10439 (Bl--42364). County undetermined: Adney s.n. [Colorado] (Ob--50859); E. Brainerd s.n. [July 4, 1897] (Vt); J. H. Cowen 4186 [Soldier Canon] (Fc, N), s.n. [Soldier Canon Road, June 20, 1895] (Io--22986); Vasey 527 [Rocky Mts., lat. 40--41°] (Pa). OKLAHOMA: Cimarron Co.: Demaree 13335 (N, Ok); G. J. Goodman 2412 (Ok); Goodman & Waterfall 4811 (Ok); Hopkins & Van Valkenburgh 5809 (Ok); G. W. Stevens 484 (Ok, Ok, St--9217, Ur); Waterfall 7437 (Ok), 9070 (Ok, St), 9737 (St). Comanche Co.: M. K. Clemens 11750 (Ba, Ba). Pontotoc Co.: G. T. Robbins 2335 (Ok). TEXAS: Brewster Co.: G. W. Brown B.107 (N); Cory 28677 (N), 28678 (N), 29861 (N), 29862 (N), 40367 (N, N), 44804 (Au); G. F. Fisher s.n. [Alpine, Aug. 23, 1932] (Gg--237864); E. J. Palmer 34240 (N); Rose-Innes & Moon 1172 (Au); O. E. Sperry T.1072 (Ca--882805); Steiger 1097 (N); B. H. Warnock 20121 (Au), 20921 (Au), T.66, in part (Au), W.283 (Au, Ca--882560, Ca--882849, N, N), W.625 (N); G. L. Webster 4466 (St). Culberson Co.: M. A. Chase 6034 (Mi); Cory 53027 (N); Hitchcock & Stanford 6782, in part (Ca--882848,

Or--45124); Moore & Steyermark 3622 (Ca--471229, Du--224477, Gg--194779, Mi, N); Scholl 8 (Au); Sperry T.129 (Om); Tharp & Janszen 49-1169 (Au--121572); Waterfall 3775 (St), 4458 (N, Pl--151556, St); Whitehouse 16894 (Sm), 16928 (Sm); M. S. Young s.n. [near Kent, 8/6/16] (Au, Au, Au). Hudspeth Co.: Ferris & Duncan 2474 (Du--126178, Gg--31431); C. H. Muller 8215 (St); Tharp 43-798 (Au, Ca--882559, N), 46212 (Au), 46217 (Au), 46235 (Au, N); Waterfall 3851 (St), 4895 (N, St). Jeff Davis Co.: Cory 40365 (Au); Moore & Moore 2 (Mv); Scholl 22 (Au); Warnock 21676 (Au); Waterfall 4722 (N, Tu--30988); M. S. Young s.n. [Davis Mts., 9/18/18] (Au, Ca--882844). Pecos Co.: G. L. Fisher s.n. [Sheffield, July 20, 1936] (B); Parks & Cory 18352 (Tr); Tharp 43-796 (Al, Au, N, Ok), 43-797 (Au, N, St). Reeves Co.: Cory 52132 (N). Terrell Co.: Parks & Turner 79 [Warnock 2050] (Au--122848). NEW MEXICO: Bernalillo Co.: C. C. Ellis 17 (N); Koelz s.n. [Sandia Mts., June 28, 1926] (Mi), s.n. [Sandia Mts., July 5, 1926] (Mi); Nelson & Nelson 169 (S); E. J. Palmer 21192 (Gg--151769); Rose & Fitch 17801 (N). Chaves Co.: F. S. Earle 322 (Vt); Earle & Earle 322 (Bm, N, Po--63867); N. A. Palmer 60, in part (Go, N, S). Colfax Co.: Ewan 13137 (En); Mathias 545 (Po--180697). De Baca Co.: A. Nelson 11307 (Ca--500721, Mg--40). Dona Ana Co.: Archer 7349 (Ca--882850); Wooton 642 (N, Ur), s.n. [Organ Mts., Sept. 17, 1893] (Ur), s.n. [May 26, 1904] (Mi). Eddy Co.: A. Nelson 11401 (Mg--38); Waterfall 3720 (St); Wilkens 1793 (W--1650339). Grant Co.: O. B. Metcalfe 126 (Ca--130179, Ca--882853, Mv, N); Mulford 681 (Io--33458, Ur); W. S. Stewart s.n. [Mimbre Mts., June 26, 1936] (Ca--882846). Guadelupe Co.: O. Degener 4515 (N); A. Nelson 11338 (Mg--41); Whitehouse s.n. [9-3-1929] (Au). Hidalgo Co.: F. A. Barkley 14786 (Au). Lea Co.: Eastwood 15427 (Gg--161887); G. L. Fisher 40111 (Ew), 40119 (Ur). Lincoln Co.: F. S. Earle 638 (N); Eggleston 18917 (W--1533627); Hitchcock, Rethke, & Van Raadshooven 4264a (Du--256178, La, Pl--89793, Se--18010, Ua--28247); Wooton 236 (Po--64523), 363 (Ca--104831, N, Po--71165, Ur); Wooton & Standley 3635 (Or--8875), 3691 (Or--8858, Or--8859); Worth s.n. [Bonnell's Ranch] (Ru). Otero Co.: Cutler 2002 (Gg--271242); Hinckley s.n. [White Mts., June 1936] (Au, Au); Waterfall 12971 (St) Quay Co.: Bailey & Bailey 101251 (Ba); G. L. Fisher s.n. [Nara Visa, Aug. 11, 1910] (Ew); G. J. Ikenberry s.n. [May 1, 1937] (St). Sandoval Co.: B. P. Keesecker 53 (Ok); A. D. Read s.n. [June 27, 1915] (Io--109457). San Miguel Co.: Anect 143 (Mv), 179 (N); Arsène 18257 (Io--128668), 18528 (B, N), 18615 (N, Po--148765), 18793 (Po--148318), 21058 (Mi); Bacigalupi 614 (Ca--882562, Du--286399); Cockerell s.n. [Las Vegas] (Gg--31290); G. J. Goodman 2308 (Io--142528, Ok--19552); A. Nelson 10548 (Up),

11566 (Mg--36); C. L. Porter 3016 (Pl--117748, Se--74896, St--25230); P. C. Standley 4951 (N); Sturgis s.n. [May 4, 1902] (Gg); Whitehouse 8741 (Au). Santa Fe Co.: Arsène 16555 (B); Bacigalupi 565 (Du--286401); Bertaud 36 (N); W. R. Dudley s.n. [1908] (Du--9547); Koelz s.n. [Santa Fé, August 1927] (Mi); A. Nelson 11757 (Mg--39); Snow s.n. [June] (Fl--21083); Vasey s.n. [Glorietta, June 1881] (Du--90892). Sierra Co.: Beals s.n. [Lake Valley, June 1904] (Mi); O. B. Metcalfe 1090 (Ca--882566, Mv). Socorro Co.: I. E. Diehl 386 (Po--71132), 491 (Po--71131); C. B. Wolf 2890 (Ba, Du--190958, Gg--174785, Po--174759, Rs--9993). Torrance Co.: F. Clark 460 (St--9202); G. L. Fisher s.n. [Torrance, July 30, 1907] (B). Union Co.: Brenckle 48081 (N); Demaree 13461 (Du--297046, N); Eggleston 20107 (W--1523089). County undetermined: Arséne s.n. [Tijeras Canon] (Ca--594662); Benedict 2329 [San Jeronimo] (S); Fendler 586 (Pr, S). ARIZONA: Coconino Co.: Clute 132 (N); H. E. Lee s.n. [9/17/36] (Tu); Shapley s.n. [Sunset Crater Natl. Mon., July 14, 1938] (N); Shreve 4772 (Fs). Graham Co.: R. J. Davis 213-35 (Ld), 225-35 (N). Navajo Co.: L. F. Ward s.n. [June 17, 1901] (N). Pima Co.: H. W. Graham s.n. [near Stratton, 8-30-46] (Ca--882561); Mearns 2677 (Du--9548, N); Shreve 5174 (Fs). MEXICO: Chihuahua: H. S. Gentry 7998 (N); LeSueur 1528 (Au); E. Wilkinson s.n. [Chihuahua, 26 Sept. 1885] (Io--92227). Coahuila: Herb. Inst. Biol. Univ. Nac. Mex. 7138, in part (Me); M. E. Jones 634 (Po--71154); Marsh 707 (Au); E. W. Nelson 6789 (N); Pringle 3467 (Io--38747, Me, Me), 13157 (Gg--421946, Mi, Vt); S. S. White 1743 (Mi); Wynd & Mueller 176 (Mi, S), 572 (N, S, St, Ur, Ur). Durango: H. W. Viereck 395 (W--1687222); Waterfall 16167 (Z). Nuevo Leon: Frye & Frye 2446 (Du--289708, N); Heard, Webster, & Barkley 14512 (Au, N); R. Schneider 927 (N). Querétaro: Agniel s.n. [Arséne 10252] (Ur); Waterfall 16545 (Ca). San Luis Potosí: C. L. Lundell 5590 (I). Sinaloa: J. Gonzalez Ortega 710 (Me). Sonora: H. S. Gentry 2122 (Ge), 7971 (N). State undetermined: Fendler 586 [Mexique, 1850] (Au--122824). LOCALITY OF COLLECTION UNDESIGNATED: H. R. Reed 34063 (Ur).

VERBENA AMBROSIFOLIA f. EGLANDULOSA Perry, Ann. Mo. Bot. Gard. 20: 328. 1933.

Synonymy: Verbena ambrosifolia var. eglandulosa Perry ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941.

Literature: Perry, Ann. Mo. Bot. Gard. 20: 312, 328, & 354. 1933; Dermen, Cytologia 7: 161 & 168. 1936; Moldenke, Suppl. List Invalid Names 7. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 18 & 42. 1942; Schnack, Anal. Inst. Fitotéc. Sta. Catalina 4: 18. 1942; Moldenke, Alph. List Invalid Names 45. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 11, 12, 14, 18, & 101.

1942; Moldenke, Alph. List Cit. 1: 4, 157, & 161 (1946), 2: 472, 473, & 522 (1948), 3: 717, 729, 731, 747, 752, 755, & 882 (1949), and 4: 990, 991, & 1150. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 19, 21, 23, 25, 26, 32, & 197. 1949; Moldenke, Am. Midl. Nat. 59: 349. 1958; Moldenke, Phytologia 5: 330. 1958; Moldenke, Résumé 24, 25, 28, 30, 31, 38, 357, 421, & 470. 1959.

This form differs from the typical form of the species in its more hirsute-hispid pubescence on the flowers and in the absence of glands. Collectors describe it as a low, ascending or erect, branched, and spreading annual herb, with fibrous roots and odorless flowers, the corollas varying from deep vivid-purple or blue-purple to reddish-purple or lavender. The chromosome number is 2n = 30.

The type of this form was collected by John Michael Holzinger at Santa Rita, Grant County, New Mexico, on August 1, 1911, and is deposited in the herbarium of the Missouri Botanical Garden at St. Louis.

The plant has been found growing along roadsides, in open fields and waste ground, juniper barrens, open ground and fields, on dry sandy hills and the banks of arroyos, in sandy, clay, or black clay soil or sandy loam, at altitudes of from 10 to 3933 meters, blooming from February to October. It has been collected in fruit in April, July, and August. Runyon says that in Cameron County, Texas, it is "very abundant.....It covers acres of ground and is widespread"; in Bee County he says it is "abundant in open fields in the Beeville region". Mueller reports that in Nuevo Leon it is "common in upper pine woods", while Schneider says it is "abundant on open rocky slopes" there.

It is separable from V. bipinnatifida only by its shorter bractlets. Herbarium material has been misidentified and distributed as V. ambrosifolia Rydb., V. ambrosiifolia Rydb., V. bipinnatifida Nutt., V. canadensis (L.) Britton, V. ciliata Benth., V. ciliata var. longidentata Perry, and V. wrightii A. Gray. The hybrid between this form and V. canadensis is known as xV. fecunda which see.

Miss Perry cites the following 14 specimens not yet seen by me: TEXAS: El Paso Co.: Wagner 974 (W). NEW MEXICO: Bernalillo Co.: E. J. Palmer 31153 (E). Dona Ana Co.: P. C. Standley s.n. [mesa just west of Organ Mts., 13 June 1906] (W); Wooton s.n. [Organ Mts., 14 July 1897] (W). Grant Co.: Holzinger s.n. [Santa Rita, 1 Aug. 1911] (E--type, W--isotype); Mearns 2278 (W). Hidalgo Co.: Mearns 2486 (W). Socorro Co.: Wooton 2835 (W). ARIZONA: Cochise Co.: Carlson s.n. [Douglas, 13 May 1915] (G, W); W. W. Jones 185 (G). Pima Co.: Toumey s.n. [Santa Catalina Mts., Sept. 15, 1896] (W). MEXICO: Sonora: Mearns 1138 (W). The Wagner 974 cited above may actually not have come from El Paso County since its label says "El Paso to Monument no. 53".

In all, 29 herbarium specimens have been examined by me.

Citations: WYOMING: Fremont Co.: T. A. Williams s.n. [Wind

River] (N). OKLAHOMA: Tillman Co.: Demaree 12188 (N). TEXAS: Bee Co.: R. Runyon 2187 (Rr). Cameron Co.: R. Runyon 1782 (Rr, Rr), 2184 (Rr). Childress Co.: Tharp s.n. [Childress, Apr. 1930--31] (Mi). Culberson Co.: M. S. Young s.n. [near Kent, 8-6-16] (Mi). Dickens Co.: J. Engleman s.n. [March 25, 1940] (Ok). Hardeman Co.: E. O. Hughes s.n. [April 30, 1950] (Ok). Jones Co.: B. Adams 9 (Nt). Nueces Co.: Tharp 5602 (Au). Rockwall Co.: E. M. Moore s. n. [5 mi. east of Rockwall, 8-8-38] (Nt). Webb Co.: Tharp s.n. [March 15, 1931] (Au). Young Co.: McCart 836 (Nt). County undetermined: Herb. Univ. Texas s.n. (Au, Au). NEW MEXICO: Grant Co.: I. E. Diehl 94 (Po--71164); O. B. Metcalfe 1231 (Gg--282714). Hidalgo Co.: Antisell 186 (N). Luna Co.: Munz 1231 (Po--123819). ARIZONA: Cochise Co.: Griffiths 1919 (N). Pima Co.: Toumey s.n. [Santa Catalina Mts., Sept. 15, 1896] (N). MEXICO: Nuevo Leon: Herb. Mexican Biol. Exped. Univ. Ill. 927 (N); C. H. Mueller 2275 (Fs, Mi); R. A. Schneider 927 (Ur, Ur); A. J. Sharp 45665 (N).

VERBENA AMOENA Paxt., Mag. Bot. 7: 3. 1840.

Synonymy: Verbena grandiflora Sessé & Moc., Pl. Nou. Hisp., ed. 1 [La Naturaleza, ser. 2, 1: app.] 6. 1889 [not V. grandiflora Bodger, 1936, nor Michx., 1821, nor Ort., 1797, nor Steud., 1895].

Literature: Paxt., Mag. Bot. 7: 3. 1840; Marnock, Floricult. Mag. 5: pl. 52. 1840; Horticulteur Univ. 2: 135. 1841; Sessé & Moc., Pl. Nou. Hisp., ed. 1 [La Naturaleza, ser. 2, 1: app.] 6. 1889; Sessé & Moc., Pl. Nou. Hisp., ed. 2, 6. 1893; Jacks., Ind. Kew. 2: 1178. 1895; Hill, Ind. Kew. Suppl. 7: 249. 1929; Stapf, Ind. Lond. 6: 428. 1931; Perry, Ann. Mo. Bot. Gard. 20: 249, 250, 312, 341, & 354. 1933; Moldenke, Prelim. Alph. List Invalid Names 46. 1940; Moldenke, Alph. List Invalid Names 47. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 18 & 101 (1942) and [ed. 2], 32 & 197. 1949; Moldenke, Alph. List Cit. 3: 831. 1949; Moldenke, Résumé 38, 365, & 470. 1959; Moldenke, Résumé Suppl. 2: 8. 1960.

Illustrations: Paxt., Mag. Bot. 7: 3 (in color). 1840; Marnock, Floricult Mag. 5: pl. 52 (in color). 1840; Horticult. Univ. 2: 135 (in color). 1841.

Herbaceous perennial; stems about 5 dm. tall, partially recumbent or decumbent to ascending, more or less tetragonal, retrorsely hispidulous with stiff whitish hairs; principal internodes 4--6 cm. long; leaves decussate-opposite, 5--8 cm. long, pinnatifid or bipinnatifid, with the lower part entire, forming a broadly margined subauriculate and semi-amplexicaul base, the lobes or divisions oblong or linear-oblong, remote, sparsely incised, closely appressed-pubescent above, hispidulous beneath, the midrib and secondaries prominent; spikes terminal, dense and fascicle-like during anthesis, long and erect, pedunculate; bracts numerous, linear-lanceolate or awl-shaped, subulate, pubescent; calyx about 10 mm. long, densely pubescent (especially

along the veins), glandular, the teeth slender, subulate, similar in form and pubescence to the bracts; corolla hypocrateriform, light- or pinkish-purple, its tube slightly longer than the calyx, pubescent outside, especially around the throat, the limb about 9 mm. wide, the lobes 5, oblong, slightly enlarged distally, bifid; anthers unappendaged; mature fruit not known.

The type of this splendid species was collected from cultivated material in the garden of the Duke of Devonshire at Chiswick, England, by Mr. Edmonds, gardener to the Duke, in the autumn of 1839. The type of V. grandiflora was collected by Martín Sessé y Lacasta and José Mariano Mociño (no. 99) at Puruandiro, Michoacán, Mexico, and is deposited in the herbarium of the Jardin Botanico at Madrid -- a photograph of the type is in the herbarium of the Missouri Botanical Garden at St. Louis.

Paxton describes the leaves of this plant as stipulate, with the "stipules much more hairy than the blade". This is an error in observation. There are no true stipules in the family Verbenaceae. What Paxton saw was the subauriculate and semiamplexicaul leaf-base. Perry says very truly that "This unique species is readily recognized by its coarse habit, together with its bipinnatifid, subauriculate and semiamplexicaul leaves." The Pringle collections cited below agree well with Paxton's illustration and with the photograph of the Sessé & Mociño type. Pringle's material was collected on hills at Lecheria, Mexico, flowering in July and August, fruiting in August.

Paxton's discussion is worth repeating here: "Beautiful as are many of the innumerable hybrid Verbenas now in the market, they are by no means comparable in value to species that are new and of a decidedly distinct character. Our nomenclature is now positively cumbered with names, commemorative only of the individuals who raised them, while the plants, in not a few instances, can scarcely be distinguished.

"We venture these remarks, not because we are averse to the practice of hybridization, for we greatly desire its more general adoption; but solely to deprecate the bestowal of a name and a position in the commercial world, on those varieties which have not some strikingly different feature from any others, to recommend them to the public. All others we would wish to see cultivated, but confined to a limited circle, and regarded as very trifling variations, not worthy of any distinctive appellation. We know several places in which this plan is judiciously followed, and trust, for the prevention of further confusion, it will be still more regarded in future.

"Of the very pretty species herewith published, its appearance is so far removed from that of all others yet introduced, that it is unnecessary to point out its distinguishing traits. The elegantly pinnatifid nature of its foliage is, we believe, quite novel in so large a species, while its long, bold, dense spikes of light purple flowers, stamp it with originality. In this last respect, some resemblance will be apparent between it and V. teucrioides.....; but this is of the slightest order,

as the blossoms of V. teucrioides are particularly distant compared with the present plant, and it wants those numberless bracts which are here so conspicuous. Indeed, V. amoena is altogether more showy and interesting than the species above alluded to, but is destitute of its sweet fragrance.

"Of its introduction to England, we have no very authentic information. We saw it first in the garden of the Horticultural Society, and from some plants which were obtained thence by Mr. Edmonds, gardener to His Grace the Duke of Devonshire at Chiswick, our figure was taken in the decline of last autumn. We have every reason to think it a native of Mexico, and it is now in several of the London nurseries.

"It is fully as hardy as V. teucrioides, or other species, simply requiring a place in a protected frame during winter, and flourishing in the open border through the summer months. On account of its partially trailing disposition, it is well adapted for planting in beds; but the luxuriance of its habit renders the number of flower-spikes it produces rather scanty compared with the dwarfer kinds. To improve this character, it is advisable to cut off the extremities of the shoots at an early period in the season, as the plants will thus be induced to emit more lateral shoots, from each of which flowers may be expected. Detached specimens do not produce a very showy effect, as there is not a sufficient quantity of stems to fill the space occupied, owing to its diffusive tendency; and it has a much better appearance in groups, because the branches can thus become intertangled with each other, and cover the entire surface. From the same cause, it is not calculated for growing in pots.

"One of the principal circumstances for which this plant will be prized, is the opportunity it will afford for uniting the rich colours of the species which have their flowers arranged in flat heads, with the lengthy spicate disposition of the blossoms by which it is peculiarly characterized. This must be effected by cross-impregnation, and it is an object worthy of the culturist's assiduous attention. Common propagation is performed in the usual manner by cuttings or layers.

"The specific designation is that by which this plant is known in the Horticultural Society's Garden, and expresses its particularly interesting aspect." He proposes the common name "pleasing vervain".

The above description and discussion are repeated here as an example of the good writing which formerly characterized scientific literature, but which is now so sadly lacking, chiefly because of our modern worship of the false god of Brevity!

Although there is no hint in Paxton's description that he regarded his plant as anything but a true species, Jackson in the "Index Kewensis" follows the name with an "x", indicating that it is a supposed hybrid. There is no basis for this assumption on Jackson's part.

In all, 6 herbarium specimens and 3 mounted photographs and illustrations have been examined by me.

Citations: MEXICO: México: Pringle 13434 (Au--181669, Gg--421279, Mi, W--1586483), 13434a (N, N--photo, Vt, Z--photo).
MOUNTED ILLUSTRATIONS: Paxt., Mag. Bot. 7: 3. 1840 (N).

VERBENA ANDALGALENSIS Moldenke, Phytologia 5: 227--228. 1955.

Literature: Moldenke, Phytologia 5: 227--228. 1955; G. Taylor, Ind. Kew. Suppl. 12: 149. 1959; Moldenke, Résumé 126 & 470. 1959.

Perennial herb growing from a woody taproot, sending up many stems from its apex; stems slender, often many-branched, the branches wiry, rather densely spreading-pilose with soft white hairs, mostly erect, to 20 cm. tall, apparently much grazed and more stubby; principal internodes 5--10 mm. long; leaves decussate-opposite, numerous, sessile, broadly linear-oblong, thin-chartaceous or membranous, 1.5--3 cm. long, uniformly gray-green on both surfaces, entire or with 2 sharply acute lobe-like teeth toward the apex, densely strigose-pubescent with white hairs on both surfaces; venation indiscernible; inflorescence terminal, densely spicate, the spikes short and head-like, the floriferous portion 1--2 cm. long and wide; peduncles very slender, 1--2 cm. long, densely spreading-pilose with white hairs; bractlets very short, lanceolate, about 2 mm. long, white-strigose on the back and long-ciliate along the margins, attenuate to a very sharp apex; calyx long-tubular, about 10 mm. long and 1.2 mm. wide, densely white-pilose, its rim 5-toothed; corolla hypocrateriform, bluish-rose, its tube glabrous, projecting 1--2 mm. from the calyx-mouth, its limb 5--6 mm. wide.

The type of this species was collected by Pedro Jörgensen (no. 1613) at Pampa del Arenal, at an altitude of 2700 meters, Andalgalá, Catamarca, Argentina, in March, 1916, and is deposited in the herbarium of the University of California at Berkeley. It is known thus far only from the type collection. Only 2 herbarium specimens, including the type, have been examined by me.

Citations: ARGENTINA: Catamarca: Jörgensen 1613 (Ca--195365--type, Z--isotype).

VERBENA ANDRIEUXII Schau. in A. DC., Prodr. 11: 553. 1847.

Synonymy: Verbena andriaei Schau. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941.

Literature: Schau. in A. DC., Prodr. 11: 553. 1847; Jacks., Ind. Kew. 2: 1178. 1895; Perry, Ann. Mo. Bot. Gard. 20: 312, 333, & 354. 1933; Moldenke, Suppl. List Invalid Names 7. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 18 & 101. 1942; Moldenke, Alph. List Invalid Names 45. 1942; Moldenke, Alph. List Cit. 1: 11. 1946; Moldenke, Phytologia 2: 383. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 48. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 32 & 197. 1949; Moldenke, Alph. List Cit. 3: 686 (1949) and 4: 1171. 1949; Moldenke, Résumé 38, 222, 357, 425, & 470. 1959; Moldenke, Résumé Suppl. 1: 8. 1960.

Stem diffuse; branches opposite, elongate, procumbent, subtetragonal, hispid; leaves sessile, about 4 cm. long, cuneate at

the base, deeply trifid, impressed-rugose, strigose-hispid on both surfaces, the middle segment pinnatifid, the lobes and the lateral segments spreading, lanceolate, rather acute at the apex, about 1 mm. wide, the margins subrevolute, entire or incised, often proliferating in the axils; spikes terminal and lateral, about 2.5 cm. long, short-pedunculate, oblong, crowded, hispid, subglandulose; bracts subulate-lanceolate, one-third as long as the calyx; calyx about 8 mm. long, the rim subulate-5-fid; corolla-tube one and a half times as long as the calyx, puberulous, the limb medium-sized, barbate in the throat; dorsal anthers with short appendages; cocci half as long as the calyx.

The type of this species was collected by G. Andrieux (no. 138) -- in whose honor it is named -- between Puebla and Oaxaca, Mexico, and is deposited in the DeCandolle Herbarium at the conservatoire et Jardin Botaniques at Geneva. Material has been misidentified and distributed in herbaria as V. aubletia L. and V. lamberti Ker. The Krause 31939, cited below, has a label stating that the plant was "verwildert in Bot. Gart. Strassbourg". The Barkley, Webster, & Paxson 857, also cited below, has extra long bracts -- it was collected in oak woodland on red clay soil, flowering in August.

In all, 5 herbarium specimens and 3 mounted phototypes have been examined by me.

Citations: MEXICO: Oaxaca or Puebla: Andrieux 138 [Macbride photos 7852] (Kr--photo of type, N--photo of type, N--photo of type). San Luis Potosí: Barkley, Webster, & Paxson 857 (Au). FRANCE: E. H. L. Krause 31939 (B). CULTIVATED: Germany: Golenz s.n. [8/9/70] (B); Grantzow s.n. [Sept. '66] (B), s.n. [Aug. 1871] (B).

VERBENA ARAUCANA R. A. Phil., Anal. Univ. Chile 43: 520--521. 1873.

Synonymy: Verbena aurantiaca Ph., in herb. [not V. aurantiaca Speg., 1902].

Literature: R. A. Phil., Anal. Univ. Chile 43: 520—521. 1873; Jacks., Ind. Kew. 2: 1178. 1895; Reiche, Fl. Chile 5: 289 & 290. 1910; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 101. 1942; Moldenke, Lilloa 8: 428 (1942) and 10: 381. 1944; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 101 & 197. 1949; Moldenke, Alph. List Cit. 3: 687, 696, & 813. 1949; Moldenke, Phytologia 3: 75. 1949; Moldenke, Résumé 121 & 470. 1959; Moldenke, Résumé Suppl. 2: 5 & 10. 1960.

Perennial, hairy (with the exception of the floral region which is only sparsely so); stems variable, ascending; leaves obovate, cuneate at the base, entire or trifid with the middle segment larger than the others, ovate, and sometimes also somewhat parted, the lateral segments oblong-linear, the whole leaf to 4 cm. long, with the petiole comprising about half this length; spikes terminal, capitate, slightly separated from the leafy region; bractlets ovate, about 2 mm. long, ciliate; calyx

prismatic, 8--10 mm. long; corolla-tube slender, about 15 mm. long; corolla-limb yellow, 5--6 mm. in diameter, composed of 5 cuneate divisions; anther-appendages thick, projecting from the throat of the corolla.

Philippi remarks that he found only a single specimen of this plant, and that this was 15 cm. tall, but that it is certainly a very characteristic species ["especie mui caracteristica"]. The type of this little-known species was collected by Rudolf Amandus Philippi in the Araucaria region at Cupulhue, Chile, and is deposited in the herbarium of the Museo Nacional de Historia Natural de Chile at Santiago. The species has been collected at altitudes of 1800 to 2500 meters, blooming in January. Herbarium material has been misidentified and distributed as V. alternifolia Herb. and V. erinoides Lam.

The Macbride 34344 photograph cited below shows no collector's name or number, and the label is inscribed "Argentina" and indicates that the specimen was in the Vienna herbarium when it was photographed. In all, 2 herbarium specimens and 6 mounted photographs, including a phototype, have been examined by me.

Citations: CHILE: Bío-Bío: R. A. Philippi s.n. [Cupulhue; Herb. Mus. Nac. Hist. Nat. Chile 42473 & 54770] (N--photo of type, N--photo of isotype). Linares: R. A. Philippi s.n. [Linares; Macbride photos 17400] (Kr--photo, N--photo). Santiago: Grandjot & Grandjot 4714 (N); Macbride photos 34344 (Kr--photo, N--photo); C. Reiche 4 (N).

VERBENA ARENARIA Moldenke, Phytologia 8: 59--60. 1961.

Herb, apparently low and wide-spreading; stem much-branched; branches slender, subtetragonal, more or less densely glandular-pubescent and also whitish-hirsute with perpendicular hairs, less so in age; nodes somewhat annulate; principal internodes about 4 cm. long or sometimes abbreviated to 1.3 cm.; leaves decussate-opposite, thin-chartaceous, rather uniformly green on both surfaces, ovate in outline, irregularly laciniate-dentate or the larger ones sub-trifid or 3-lobed at the base, the lobes incised-dentate, more or less hirsute-pubescent on both surfaces, often with gland-tipped hairs, especially along the larger venation beneath, cuneately narrowed into a petiole which is 5--10 mm. long and scarcely distinguishable from the lamina-blade; inflorescence axillary and terminal, capitate, slightly elongating in fruit, conspicuously hirsute throughout; peduncles very slender, short, about 2 cm. long, whitish-hirsute; heads many-flowered, dense; bractlets lanceolate, about 5 mm. long, about 1 mm. wide at the base, densely long-ciliate on the margins and puberulent elsewhere, about equaling the calyx; calyx tubular, 5--6 mm. long, densely short-pubescent and also sparsely hirsute with much longer divergent hairs, often somewhat glanduloso; corolla hypocrateriform, blue, the tube about 10 mm. long, glabrous outside, the limb about 7 mm. wide.

The type of this species was collected by Santiago Venturi (no. 2441) at Rio Lali, dept. Capital, Tucumán, Argentina, along

the banks of the river, at an altitude of 450 meters, on December 18, 1923, and is deposited in the United States National Herbarium at Washington. Only 2 specimens have been examined by me.

Citations: ARGENTINA: Tucumán: Venturi 2441 (W--1591259--type, Z--isotype).

xVERBENA ARGENTINA Moldenke, Phytologia 8: 60. 1961.

Herb, probably a natural hybrid between V. cabrerae Moldenke and V. calliantha Briq., with the tomentum of the former and the leaves of the latter species; stems apparently sprawling or decumbent, rooting at the nodes, branched from near the base; branches slender, obtusely tetragonal, very sparsely scattered-pilose with appressed hairs; leaves decussate-opposite, often with smaller ones on much abbreviated branchlets in their axils; petioles slender, 3--9 mm. long, rather sparsely strigose with antrorse hairs; leaf-blades chartaceous, somewhat lighter green beneath, ovate in outline, small, 1--2.5 cm. long, 1--2 cm. wide, irregularly incised-laciniate or the larger ones trifid at the base, the lobes 2-toothed, rather sparsely short-strigose on both surfaces with inconspicuous appressed antrorse hairs, cuneately narrowed at the base into the petiole; venation somewhat prominulous beneath; inflorescence terminal, solitary, spicate, long-pedunculate; peduncles slender, 5.5--7.5 cm. long, sparsely pilosulous-strigose with antrorse hairs; rachis densely spreading-pubescent; bractlets lanceolate-ovate, short, about 3 mm. long, much shorter than the calyx, acuminate, densely long-ciliate on the margins from the base to the mid-point; calyx tubular, 7--9 mm. long, densely white-strigose with closely appressed antrorse hairs, 5-apiculate at the apex, 2 of the apiculations longer than the other 3; corolla hypocrateriform, its tube about 14 mm. long, glabrous outside, the limb about 12 mm. wide.

The type of this hybrid was collected by Santiago Venturi (no. 14) at Mocovi, Santa Fecino, Chaco, Argentina, on September 14, 1903, and is deposited in the United States National Herbarium at Washington. Only 2 specimens, including the type, have been examined by me.

Citations: ARGENTINA: Chaco: Venturi 14 (W--1043597--type, Z--isotype).

VERBENA ARISTIGERA S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 439. 1895.

Literature: S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 439. 1895; Durand & Jacks., Ind. Kew. Suppl. 1: 451. 1906; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 101. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 41. 1942; Moldenke, Castanea 3: 117 & 118. 1948; Moldenke, Alph. List Cit. 2: 552 (1948), 3: 687, 705, 748, 781, & 916 (1949), and 4: 1092, 1165, & 1198. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93, 97, 99, 105, & 197. 1949; Moldenke, Phytologia 3: 135 (1949) and 3: 289. 1950; Moldenke, Résumé 109, 115, 117, 119,

126, & 470. 1959.

Subshrub 15--50 cm. tall; stems procumbent at the base, woody; nodes slightly swollen; branches wide-spreading, assurgent or erect, tetragonal, about 2 mm. in diameter, obsoletely striate, strigose-pubescent with appressed hairs, finally becoming merely puberulous; principal internodes 4--4.5 cm. long; leaves decussate-opposite, petiolate; petioles to 1 cm. long, subalate; leaf-blades firm in texture, pinnatifid-trisect, to 3.5 cm. long and 4 cm. wide, strigose-pubescent with appressed hairs, the segments linear or linear-subulate, rigid, mucronate at the apex, often falciform-curvate, varying in length to 1 cm., not over 1 cm. wide; inflorescence spicate, the spikes at first abbreviated, about 1.5 cm. long and wide, finally elongating to 7 cm., densely flowered, strigose-pubescent; peduncles about 1.5 mm. long when young, later elongating to 6 cm.; bractlets rather rigid, subulate, ascending, about 4 mm. long, strigose-pubescent; calyx long-tubular, the tube about 6 mm. long and 0.7 mm. wide, the teeth elongate, very narrow, 2--3 mm. long, bristle-like, spreading; corolla varying from blue or lilac to violet, pink-purple, or purple, its tube greatly surpassing the calyx, slightly over 1 cm. long, about 1 mm. wide at the base and almost 2 mm. wide at the mouth, slightly curvate, very slightly ampliate toward the apex, hirsute at the stamen insertion within and elsewhere puberulous, the lobes obovate-oblong, 3--3.5 mm. long, about 2 mm. wide, retuse at the apex; stamens short, inserted about 8 mm. above the base of the corolla-tube, the filaments slightly shorter than the acute anthers; anther-connective not appendaged; style elongate, about 9 mm. long, much longer than the ovary, minutely puberulent, slightly incurved at the apex; ovary about 5 mm. long, glabrous; fruiting-calyx unchanged; fruit linear, somewhat inequilateral; cocci to 2 mm. long, about 4 times longer than wide, longitudinally ribbed, somewhat scrobiculate.

The type of this species was collected by Spencer le Marchant Moore (no. 1083) near Mt. Pão d'Assucar, between Coimbrá and Rio Apa, in Matto Grosso, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed. The species has been found in rather wet sandy fields, campos and wet sandy campos, and sandy soil along railroad tracks in full sun, at altitudes of 250 to 700 meters, blooming from July to May. It is certainly very closely related to V. tenuisecta Briq., and it has been suggested that the two are conspecific (in which case this name would replace that of Briquet). However, it seems to me that they are sufficiently distinct to maintain as separate taxa. Moore compares the species with V. laciniata (L.) Briq. as follows: "A V. crinoidi, Lam., cui sat similis ob calycis dentes longe ac patule aristatus necnon antherarum connectivum eglanduloosum, nullo negotio agnoscenda."

V. aristigera is called "margarita", and herbarium material has been misidentified and distributed as V. dissecta Willd. and V. tenuisecta Briq. Anisits reports it as "frequent" at Estancia Santa Maria, Paraguay, while Meyer says that it is "common"

at Resistencia, Chaco, and vicinity, growing in campos and mattorales.

In all, 40 herbarium specimens and 3 mounted phototypes have been examined by me.

Citations: BRAZIL: Matto Grosso: F. C. Hoehne, Com. Rondon 67 (N); Malme s.n. [25/7/1903] (S); S. Moore 1083 [Macbride photos 17403] (Kr--photo of type, N--photo of type, N--photo of type). BOLIVIA: Oriente: Cardenas 2559 (N). PARAGUAY: Anisits 2591 (N, S); Fiebrig & Osten s.n. [Herb. Osten 8064] (N, Ug); Hassler 1012 (N); A. Lutz 1504 (Z); Malme s.n. [27/3/1903] (N, S); Morong 219 [Herb. Osten 13013] (Ug); Osten 9013 (Ug), 9016 (S, Ug); T. Rojas 153 (S), s.n. [Hassler 1602; Herb. Osten 8383] (N, Ug), s.n. [Hassler 2650] (S). URUGUAY: Berro 4746 (N); Castellanos s.n. [Herb. Inst. Miguel Lillo 15051] (N), s.n. [Herb. Inst. Miguel Lillo 15126] (N). ARGENTINA: Chaco: T. Meyer 292 (Ug--10954); Venturi 9780 (N). Formosa: Eyerdam & Beetle 22934 (Ca--652375); I. Morel 70 (Gg--353256, N), 1127 (N), 1385 (Gg--352672, N), 1760 (N), 1765 (N), 2261 (N), 2605 (N); Pierotti 4176 (N), 4220 (N); Reales 365 (N).

VERBENA ATACAMENSIS Reiche, Anal. Univ. Chile 123: 369 & 371. 1908.

Synonymy: Verbena stacamensis Reiche ex Moldenke, Résumé 374, in syn. 1959.

Literature: R. A. Phil., Fl. Atac. 40. 1860; R. A. Phil., Viage Des. Atac. 20, 25, & 214. 1860; Reiche, Anal. Univ. Chile 123: 371. 1908; Reiche, Fl. Chile 5: 291--292. 1910; Prain, Ind. Kew. Suppl. 4: 245. 1913; I. M. Johnst., Contrib. Gray Herb. 85: 100--101. 1929; Moldenke, Lilloa 6: 321--322. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 101. 1942; Moldenke, Alph. List Cit. 1: 251 (1946) and 4: 1116. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 101 & 197. 1949; Moldenke, Résumé 121, 374, & 470. 1959.

Perennial plant or decumbent bush, green, hispid; stems variable from the same root, ascending, about 15 cm. long; leaves numerous, sessile, 2--2.5 cm. long, trifid to the base, with the segments linear, obtuse, entire or with a small lateral lobule, roughened at the margins, with leafy branchlets issuing from their axils; inflorescence long-pedunculate, capitate, but with the lowest flowers somewhat distant; bractlets lanceolate, reaching to about the middle of the calyx; calyx prismatic, about 6 mm. long, with 5 short triangular teeth; corolla white to lavender or rose-lavender, its tube about 8 mm. long, hairy in the throat, the limb violet, about 8 mm. in diameter, composed of 5 cuneate and deeply emarginate lobes; anther-appendages thick, dark, markedly projecting; fruit unknown.

The type of this species was collected by Carl Friedrich Reiche in the southern part of the province of Atacama, Chile. The species has been found on rocky slopes and open west-facing

slopes of quebradas, at altitudes of 50 to 150 meters, blooming in September and October. Worth & Morrison report it as "not common". It has been misidentified and distributed in herbaria as V. porrigens Phil. and V. sulfurea Don. Johnston (1929) says that the V. sulphurea and V. erinoides of R. A. Philippi (1860) are actually V. atacamensis. In all, 8 herbarium specimens have been examined by me.

Citations: CHILE: Antofagasta: Wall & Sparre 789 (Ew); Werdermann 789 (Gg--143041, N, S). Atacama: Werdermann 1632 (N, S); Worth & Morrison 16154 (Ca--630350), 16169 (Ca--630339).

VERBENA AURANTIACA Speg., Rev. Agron. La Plata 3: 563. 1897.

Literature: Speg., Rev. Agron. La Plata 3: 563. 1897; Speg., Anal. Soc. Cient. Argent. 53: 249. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 191. 1904; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patag. 8 (2): 863. 1905; Moldenke, Lilloa 6: 322. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke, Alph. List Cit. 1: 164. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 197. 1949; Moldenke, Phytologia 3: 76 (1949) and 3: 305. 1950; Moldenke, Résumé 126 & 470. 1959; Moldenke, Résumé Suppl. 2: 5 & 10. 1960.

Perennial, woody at base; stems woody; branches numerous, erect, arising from the apex of the stem, to 30 cm. tall, slender, stramineous, subterete or slightly subtetragonal, very minutely puberulous or glabrescent; nodes not annulate; principal internodes 4—7 cm. long; leaves decussate-opposite, numerous, fleshy when fresh; petioles slender and winged, merging into the base of the blade, obscure or obsolete; leaf-blades uniformly bright-green on both surfaces, ovoid-lanceolate or the uppermost oblong, 1.5—2.5 cm. long, 3—14 mm. wide, deeply trifid or the uppermost merely basally 3-lobed or even entire, long-attenuate in cuneate fashion into the winged petiole at the base, the divisions sometimes with a lateral lobe on the largest leaves, very obscurely scattered-pilosulous or glabrescent on both surfaces; inflorescence terminal and terminating a few lateral twigs near the apex of the branches, fasciculate-subcapitate, rather many-flowered; peduncles slender, subterete, 1.5—3 cm. long, very minutely and obscurely grayish-puberulent; bractlets lanceolate-ovate, 2—3 mm. long, about 1 mm. wide at the base, acute at the apex, strigillose on the back, ciliolate along the margins; calyx cylindric, about 1 cm. long, plainly 5-ribbed and deeply 5-sulcate, white-pilosulous or -strigose on the outer surface, the teeth small, irregular, subulate; corolla hypocrateriform, cream-colored or yellow, its tube cylindric, about 14 mm. long, glabrous on the outside, the limb about 6 mm. wide, bearded at the mouth inside; anthers slightly exserted or subequaling the corolla-tube.

The species is found in dry sandy scrub and on mountain ridges above the barrel-cactus zone, at altitudes of 300 meters, blooming from November to January. It has been misidentified and distributed in herbaria as V. flava Gill. & Hook. In all, 11

herbarium specimens have been examined by me.

Citations: CHILE: Malleco: Behn 8031 (S). ARGENTINA: Chubut: O'Donell 3480 (N, Tl). Mendoza: H. H. Bartlett 19410 (Ca--772266). Neuquen: Senn 4326 (N). Santa Cruz: Donat 219 (Ca--470464, Gg--194031, Go, N, N, S).

VERBENA AURANTIACA var. GLABERRIMA Moldenke, Phytologia 5: 341--342. 1956.

Literature: Moldenke, Phytologia 5: 341--342. 1956; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 126 & 470. 1959.

This variety differs from the typical form of the species in being completely glabrous throughout. The corolla is described as yellow or lemon-yellow.

The type of the variety was collected by Adrian Ruiz Leal and F. A. Roig (no. 15723) at Malalhue, Alto Valle del Atuel, at an altitude of 2100 meters, Mendoza, Argentina, between January 9 and 17, 1954, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. The variety has been found by Ruiz Leal also at the edge of the crater of the Diamente volcano, at 1800 meters altitude. It has been found blooming in January and February. Two herbarium specimens, including the type, have been examined by me.

Citations: ARGENTINA: Mendoza: Ruiz Leal 17000 (Ss); Ruiz Leal & Roig 15723 (Z--type).

VERBENA AURANTIACA f. ROSEA Moldenke, Phytologia 5: 342. 1956.

Literature: Moldenke, Phytologia 5: 342. 1956; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 126 & 470. 1959.

This form differs from the typical form of the species in having rose-colored corollas.

The type of the form was collected by Adrian Ruiz Leal (no. 14703) between Estancia Pío-Pío and Colonia Sarmiento, Comodora Rivadavia, Chubut, Argentina, on December 17, 1953, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. Ruiz Leal also collected it along city streets. Two herbarium specimens, including the type, have been examined by me.

Citations: ARGENTINA: Chubut: Ruiz Leal 14703 (Z--type), 14704 (Ss).

VERBENA AUSTRALIS Moldenke, Phytologia 2: 419--420. 1948.

Literature: Moldenke, Phytologia 2: 419--420. 1948; Moldenke, Castanea 13: 117. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93 & 197. 1949; Moldenke, Alph. List Cit. 4: 1250. 1949; Stellfeld, Trib. Farmac. 19 (10): 166. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Angely, Fl. Paran. 12: 17. 1958; Moldenke, Résumé 109 & 470. 1959; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961.

Herb with decumbent stems, ascending at their tips, not much branched; stems and branches slender, acutely tetragonal, sulca-

te, lightly strigillose-pubescent with spreading or subappressed hairs; principal internodes 2—8.5 cm. long; nodes annulate; leaves rather sparse, decussate-opposite, sometimes with a few small ones in their axils; petioles slender, 3—5 mm. long, margined, strigillose; leaf-blades thin-chartaceous, rather uniformly bright-green on both surfaces, ovate in outline, 1—3 cm. long, 0.8—1.8 cm. wide, deeply 3-lobed, the lobes again dissected with rather broad and blunt secondary lobes, very sparsely and obscurely strigillose above, somewhat more densely so and punctate beneath, the very slender midrib and secondaries often slightly subimpressed above and prominulous beneath in drying; veinlet reticulation indiscernible on both surfaces; inflorescence spicate, terminal and in the uppermost axils, densely congested during anthesis, later elongating to about 3 cm.; peduncles slender, tetragonal, rather densely strigillose-pilosulous with very short white antrorse hairs; rachis densely puberulent; bractlets lanceolate, 3—4 mm. long, about 1 mm. wide, acute at the apex, glabrate except for the white-ciliolate margins; calyx tubular, about 5 mm. long, very minutely strigillose on the 5 ribs or glabrate, the teeth short, acute, not appendaged, membranous and purplish between the ribs toward the apex; corolla-tube about 6 mm. long, very sparsely and minutely pilosulous on the outside above the calyx; corolla-limb about 5 mm. wide, very minutely and sparsely pilosulous on the outer surface.

The type of this species was collected by Per Karl Hjalmar Dusén (no. 13190) in wet almost swampy soil at Jaguariahyva, Paraná, Brazil, on October 10, 1911, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. It is known thus far only from two collections. In all, 3 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: Braga, Moreira, & Lange 328 (Z); Dusén 13190 (F—photo of type, N—isotype, N—photo of type, S—type, Si—photo of type, Z—photo of type).

xVERBENA BAILEYANA Moldenke, Phytologia 2: 235—236. 1947.

Synonymy: Verbena tetrandra, spicis longis acuminatis, foliis multifido-laciniatis Haartman, Amoen. Acad. 3: 43. 1756. Verbena hastata x spuria Haartm., Amoen. Acad. 3: 43. 1756. Verbena spuria x hastata Haartm., Amoen, Acad. 3: 43. 1756.

Literature: Haartm., Amoen. Acad. 3: 43. 1756; H. F. Roberts, Pl. Hybrid. Before Mendel 24. 1929; Moldenke, Phytologia 2: 235-236. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 24 & 26. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 49. 1948; Moldenke, Alph. List Cit. 2: 356 (1948) and 4: 1232. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 163 & 197. 1949; Moldenke, Phytologia 3: 466 & 467. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2210. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Am. Midl. Nat. 59: 342. 1958; Moldenke, Résumé 222, 365, 366, 371, 374, 376, & 470. 1959.

Herb; stems erect, branched, rather sharply tetragonal, sul-

cate between the angles, strigillose with short, stiff, white, antrorsely subappressed hairs; nodes annulate; principal internodes 2.5--5 cm. long; leaves decussate-opposite, usually with several small ones on very abbreviated twigs in their axils; petioles obsolete or to 2 cm. long and broadly winged, merging indistinguishably into the base of the blade; leaf-blades chartaceous, rather uniformly bright-green on both surfaces, 7--10 cm. long, 2.5--6 cm. wide, ovate in outline, acute at the apex, cuneately narrowed into the broadly winged petiole at the base, irregularly and deeply incised-laciniate, the lowermost lobes on the largest leaves often hastate, strigillose on both surfaces with short subappressed antrorse whitish hairs, scabrous above when the finger is drawn from the apex toward the base; midrib slender, impressed above, prominulous beneath; secondaries slender, 4 or 5 per side, ascending, not much arcuate, irregularly branched, a branch usually extending to the tip of the larger lobes; veinlet reticulation subimpressed above, plane but visible beneath; inflorescence a terminal panicle, the lowest branches of which are axillary to the uppermost much reduced leaves, the panicle about 15 cm. long and 5 cm. wide, its branches erect or ascending, strigillose-puberulent; bracts lanceolate, 5--8 mm. long, densely strigillose; bractlets similar but smaller, slightly shorter than the calyx, attenuate; calyx about 2.5 mm. long, densely strigillose, slightly exceeding the bractlets.

The type of this hybrid was collected from cultivated material in the Jardin des Plantes at Paris in 1819 and is deposited in the Dudley Herbarium at Stanford University. It is apparently a hybrid between V. officinalis L. and V. hastata L., with, in general, intermediate characters. It is named in honor of Dr. Liberty Hyde Bailey (1858--1954), distinguished worker on cultivated plants, expert on Carex, Rubus, and palms, kindly gentleman and friend.

The hybrid is said to have been growing in Swedish gardens as early as 1748. Normally the two parent species would seldom be found growing in close proximity to each other -- one being European and the other North American. The former, however, has been introduced and grows as a weed in many parts of eastern North America where V. hastata grows naturally, and the latter is sometimes cultivated (and even naturalized) in Europe where V. officinalis is very common. The supposed hybrid shows a marked dominance of V. hastata characters. The Austrian specimen cited below does not bear any indication on its label that it came from cultivated material, but I assume that it did.

Haartman states in Amoen. Acad. 3: 43 (1756) that this hybrid originated naturally in the Botanical Garden at Uppsala, Sweden, in 1748, perishing two years later. It arose in the same bed with the two parents "but not through dissemination, considering that no one had the seeds here hitherto, nor through a planting of it, since it had not previously been seen within the country."

In all, 3 herbarium specimens, including the type, and 3 mounted photographs have been examined by me.

Citations: CULTIVATED: Austria: Herb. Reichenbach f. 160270 (N, V). France: Herb. W. H. Harvey s.n. [h. R. P. 1819] (Du--166438--type, F--photo of type, N--photo of type, Z--photo of type).

VERBENA BAJACALIFORNICA Moldenke, Phytologia 2: 22--23. 1941.

Literature: Moldenke, Phytologia 2: 22--23. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 18 & 101 (1942) and [ed. 2], 32 & 197. 1949; Moldenke, Alph. List Cit. 3: 933 (1949) and 4: 1244. 1949; Shreve & Wiggins, Carnegie Inst. Wash. Publ. 591: 117 & 127. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Résumé 38 & 470. 1959.

Annual herb; stems erect, simple or sparsely branched, 8--15 cm. long, obtusely tetragonal, sparsely hirsutulous with mostly scattered, stiff, whitish, non-glandular hairs about 1 mm. long, glabrescent in age, sometimes decumbent at the very base and throwing out roots from the lower nodes; leaves decussate-opposite, petiolate; petioles distinct, very slender, 1--10 mm. long, densely or sparsely hirsutulous with stiff, white, non-glandular hairs like the stems, slightly margined; leaf-blades chartaceous, uniformly green on both surfaces, ovate in outline, 0.8--2.7 cm. long, 0.4--1.8 cm. wide, sparsely hirsutulous-pilose with rather short and subappressed whitish hairs on both surfaces, more densely so along the midrib and larger veins beneath, abundantly pinnatifid-incised, sometimes obscurely 3-parted with the divisions again abundantly pinnatifid-incised, the lobes rounded, subrevolute along the margins; inflorescence erect, long-pedunculate, 5--15 or more cm. long; peduncles slender, obtusely tetragonal, 2--6.5 cm. long, sparsely hirsutulous-pilose with rather scattered non-glandular whitish hairs; rachis densely many-flowered, more densely hirsutulous, not glandular, the flowers close together and densely imbricate before, during, and even after anthesis or the 2 or 3 lowermost to 5 mm. apart in fruit; bractlets very small, lanceolate, 2--3 mm. long, about half the length of the calyx, attenuate at the apex, glabrate except for the long-ciliate margin; calyx tubular, 4--5 mm. long, irregularly short-pubescent with whitish spreading hairs, obscurely (if at all) glandular; corolla 7--8 mm. long, slightly projecting from the calyx, its tube slightly puberulent at the apex on the outer surface, its limb about 4 mm. wide; fruit not known.

The type of this species was collected by Forrest Shreve (no. 7169) eighteen miles north of El Refugio, Baja California, Mexico, on March 16, 1935, and is deposited in the herbarium of the University of Michigan at Ann Arbor. It is closely related to V. shrevei Moldenke, but differs in its ovate abundantly incised-pinnatifid leaves, sparser non-glandular pubescence on the stems and peduncles, densely flowered spikes with closely imbricate flowers even after anthesis, and very short non-glandulose bractlets. It is known thus far only from the type collection and has been misidentified and distributed in herbaria as V. pumila Rydb.

In all, 4 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: MEXICO: Baja California: Shreve 7169 (Du--265833--isotype, Fs--isotype, Mi--type, N--isotype, N--photo of type, Z--photo of type).

VERBENA BALANSAE Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 293--294. 1904.

Synonymy: Verbena thymoides Chod. apud Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059, in syn. 1904 [not V. thymoides Cham., 1832].

Literature: Chod., Bull. Herb. Boiss., sér. 2, 2: 818. 1902; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 293--294. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 481. 1904; Briq., Arkiv Bot. 2 (10): 12. 1904; Prain, Ind. Kew. Suppl. 3: 187. 1908; Moldenke, Suppl. List Invalid Names 10. 1941; Moldenke, Lilloa 6: 322 (1941) and 8: 428. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38, 41, & 101. 1942; Moldenke, Alph. List Invalid Names 51. 1942; Moldenke, Alph. List Cit. 1: 26 & 264. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 49. 1948; Moldenke, Castanea 13: 117 & 118. 1948; Moldenke, Alph. List Cit. 2: 600 (1948), 3: 665, 693, & 704 (1949), and 4: 1249--1251. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 93, 99, 100, & 197. 1949; Moldenke, Phytologia 3: 288. 1950; Stellfeld, Trib. Farmac. 19 (10): 166. 1951; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 109, 117, 119, 126, 376, & 470. 1959; Moldenke, Résumé Suppl. 1: 7 (1959) and 2: 5. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961.

Perennial herb or subshrub, to 50 cm. tall; caudex rather thick; stems erect, virgate, thick, simple or with elongate-ascending branches, subtetragonal, shortly substrigose-canescent throughout with forward-pointing hairs; principal internodes 0.5-1 cm. long; leaves sessile, tripartite to the base, the segments very narrowly linear, 0.5--2 cm. long, 0.2--1 mm. wide, acute and thickened at the apex so as to appear mucronate or needle-like, revolute along the margins, approximate, substrigose-canescent with appressed hairs on both surfaces, the lateral ones bifid or entire; inflorescence spicate, borne at the apex of the branches, short-pedunculate, few-flowered, subcapitate during anthesis, finally oblong; bractlets ovate-lanceolate, 1--3 mm. long, usually 1/5 or 1/4 (or even to 1/2) as long as the calyx, acute at the apex, substrigose-canescent throughout; calyx long-tubular, narrow, 6--7 mm. long, antrorsely substrigose-canescent throughout, with no or very sparse glands, the tube about 5 mm. long, the teeth 5, unequal, lanceolate-subulate, about 0.5 mm. long during anthesis, but to 2 mm. long and subulate after anthesis and then connivent; corolla varying from lilac or blue to white, glabrous outside, the tube included by the calyx, the limb about 4 mm. wide, the lobes subequal, obovate, emarginate at the apex, barbellate-villous with blue hairs at the throat; stamens 5 or 4

and didynamous, included; style included; ovary 4-celled; cocci 4, oblong, yellowish, to 3 mm. long, with elevated reticulations on the outside.

Cotypes of this species were collected by Benedict Balansa (no. 1028) — in whose honor it is named — on the campos at Caagaazu, in March, 1876, and (no. 1163) at Utangu, near Villa-Rica, in December, 1874, and are deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. The former collection has blue flowers and the latter white, so if the white-flowered form should be separated, 1028 would become the type of the species and 1163 would become the type of the white-flowered form.

This handsome species is very closely related to V. thymoides Cham., which is also characterized by leaves tripartite to the very base. The two species are easily distinguished by the length of the calyx. In V. thymoides it is shortly campanulate-tubular and not over 4 mm. long, including the teeth, while in V. balansae it is 6—7 mm. long. Briquet verified this by examination of an original cotype of V. thymoides in the DeCandolle Herbarium. He remarks that V. thymoides seems to have a low prostrate habit, while V. balansae is erect, but admits that he is not sure of what value this character is in view of the wide variability in this respect claimed by Chamisso for his species. Briquet also notes a difference between Balansa's two collections as to leaf characters — in no. 1028 the leaves are "courtes appliquées et très grises", perhaps due to its being a sunshine form, while in no. 1163 they are "deviennent plus étalées, plus longues et plus vertes", perhaps due to it being a denizen or inhabitant of less arid situations. He cites Lindman A.1189 as "Exp. 1. Regn. A 1189". He goes on to say that "Le type récolté par M. Lindman cadre exactement avec la plante trouvée au Paraguay par Balansa et ne nous paraît pa pouvoir être réuni avec le V. thymoides Cham. à cause des dimensions du calice, au moins dans l'état actuel de nos connaissances." Apparently due to typographic errors, Briquet, in his original description, says that the leaf-segments of V. balansae are "0,2—1 cm." wide and the cocci "ad 3 cm. altae." Doubtless "mm." was intended in both instances.

V. balansae is said by collectors to inhabit campos and high dry campos, fields, dry grasslands, and rocky places, blooming from September to April. Jörgensen says that it is "common on campos". Vernacular names are "camaradinha", "formosa sem dote", and "jurupeba". It has been widely misidentified and distributed in herbaria as V. thymoides, while the Hassler 4951, determined as V. balansae in the Britton Herbarium, is something non-verbenaceous. The species has been recorded from Uruguay on the basis of Osten 22375, but this collection appears to be V. thymoides f. albiflora Moldenke instead. In all, 38 herbarium specimens and 6 mounted photographs, including 2 of cotypes, have been examined.

Citations: BRAZIL: Paraná: Dusén 37 [15.3.1904] (S), 2447

[Herb. Mus. Nac. Rio Jan. 46565] (N, S), 7692 (S), 7971 (S), 10467 (N, S), 10847 (N, N, S), 16907 (S), 17923 (S), s.n. [17/2/1911] (S); Hatschbach 2534 (N), 2765 (N), 5467 (Z). Rio Grande do Sul: Lindman A.1189 (N, S); Malme 946 (S), 946a (S), 946b (N, S), 946c (S); A. R. Schultze 91 (N). Santa Catarina: Reitz C.883 (N); Ule 1175 [Herb. Osten 13010] (Ug). PARAGUAY: B. Balansa 1028 [Macbride photos 24680] (Kr--photo of cotype, N--photo of cotype); Hassler 4343 (Mi), 4640 (N), 7104 (N), 9072 (Cb, N--photo, N--photo, V, Z--photo, Z--photo); Jürgensen 4582 [Herb. Osten 22252] (N, S, Ug). ARGENTINA: Corrientes: Pedersen 2906 (N, S). Misiones: Ekman 2021 (Mi, N).

VERBENA BALSII Moldenke, Phytologia 1: 477--478. 1940.

Literature: Moldenke, Phytologia 1: 477--478 (1940) and 1: 511. 1941; Moldenke, Lilloa 6: 322. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke, Alph. List Cit. 1: 28. 1946; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 49. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 197. 1949; Moldenke, Alph. List Cit. 4: 1075. 1949; Moldenke, Phytologia 4: 188. 1953; Moldenke, Résumé 126 & 470. 1959.

Dense, many-stemmed plants, woody at the base, forming domed tufts to 1 m. in diameter; stems simple or very sparsely branched, 15--22 cm. long, densely pubescent throughout; nodes annulate; principal internodes 1--3 cm. long; leaves decussate-opposite, sessile, loosely clothing the stems, gray, softly hairy; leaf-blades chartaceous, cuneate-obovate, 1--3 cm. long, 1--2.3 cm. wide, rounded in outline at the apex and distinctly 3-lobed, long-cuneate to the base, densely short-pubescent with brownish or grayish often glad-tipped hairs on both surfaces, less densely so in age and then often with the pubescence beneath limited to the larger venation, each lobe often again 3-lobulate, the lobes oblong and blunt; midrib and secondaries impressed above, prominulous beneath; veinlet reticulation practically indiscernible on either surface; inflorescence terminal, apparently compound, but forming an extremely large and dense glandular many-flowered head 3.5--5 cm. in diameter; peduncles obsolete or very short; bractlets numerous, linear, about 1 cm. long, very densely spreading-pubescent; flowers sweet-scented; calyx tubular, about 5 mm. long, densely spreading-pubescent with whitish gland-tipped hairs; corolla rose or creamy-pink to blue, its tube about 1 cm. long, the limb about 6 mm. in diameter.

The type of this showy and most distinctive species was collected by Edward K. Balls (no. 6036) -- in whose honor it is named -- among rocks on dry sunny exposures in shaley formations well above the moisture line in the Chorru valley, near Tilcara, at an altitude of 12,800 feet, Jujuy, Argentina, on February 13, 1939, and is deposited in the United States National Herbarium at Washington. It has also been found in meadows and quebradas, blooming in February and March. Apparently it grows at altitudes

of 3000 to 4265 meters. In all, 6 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: ARGENTINA: Jujuy: Balls 6036 (Ca--683518--isotype, N--photo of type, W--1777791--type, Z--photo of type). Salta: Sleumer & Vervoorst 3006 (N, N, W--2173298); Venturi 6714 (W--1591490).

VERBENA BANGIANA Moldenke, Phytologia 3: 63--64. 1949.

Literature: Moldenke, Phytologia 3: 63--64. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97 & 197. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Résumé 115 & 470. 1959.

Herb; stems and branches rather acutely tetragonal, scattered-pilose, more densely so on the youngest parts, often more or less hollow and then deeply sulcate in drying; nodes annulate; principal internodes 3--10 cm. long; leaves decussate-opposite; petioles 5--10 mm. long, broadly winged and merging into the blade; leaf-blades chartaceous, rather uniformly bright-green on both surfaces, elliptic or slightly obovate, acute at the apex, long-attenuate into the petiole at the base, rather irregularly dentate from the widest part to the apex or occasionally from below the widest point with sharply acute antrorse and slightly divergent teeth, or the uppermost ones oblong and entire, rather sparsely appressed-pubescent or strigose on both surfaces; the slender midrib and 6--8 secondaries subimpressed above and prominent beneath; larger parts of the veinlet reticulation often also subimpressed above and prominulous beneath; inflorescence terminal and in the uppermost axils, spicate; peduncles resembling the uppermost parts of the stem and branches in all respects, 1--7 cm. long, pilose; floriferous portion of the spikes short and very dense-flowered, 2--6 cm. long, conspicuously bracteate; bractlets oblong-lanceolate, about 5 mm. long, acuminate at the apex, ciliolate-pilosulous, or the lowest pair to 2 cm. long and 3 mm. wide; calyx about 4 mm. long, strigose-pilosulous, 5-costate, 5-apiculate; corolla-tube barely surpassing the calyx, its limb about 1.5 mm. wide.

The type of this species was collected by Henry Hurd Rusby (no. 911) at Sorata, at an altitude of 8000 feet, La Paz, Bolivia, in February, 1886, and is deposited in the Columbia University Herbarium at the New York Botanical Garden. It is named in honor of Miguel Bang, who collected so extensively in Bolivia for Dr. Rusby. The species resembles V. litoralis H.B.K. in general habit, while its inflorescences resemble those of V. hispida Ruíz & Pav. It may possibly prove to be a natural hybrid between the two, the same as the hybrid produced artificially by Dermen and named xV. bealei Moldenke, the type of which I have not as yet seen. V. bangiana is known thus far only from the type collection, of which 3 mounted specimens have been examined.

Citations: BOLIVIA: La Paz: H. H. Rusby 911 (C--type, Pa--isotype, Pr--isotype).

VERBENA BARBATA Grah., Edinb. New Philos. Journ. 4 [Oct.-Dec.]: 176--177. 1827.

Literature: R. Grah., Edinb. New Philos. Journ. 4 [Oct.-Dec.]: 176--177. 1827; Sweet, Hort. Brit., ed. 2, 418. 1830; Walp., Repert. 4: 33. 1845; Schau. in A. DC., Prodr. 11: 555. 1847; Jacks., Ind. Kew. 2: 1178. 1895; Perry, Ann. Mo. Bot. Gard. 20: 342 & 355. 1933; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 18 & 101 (1942) and [ed. 2], 32 & 197. 1949; Moldenke, Résumé 38 & 470. 1959.

Stem somewhat woody below, tetragonal, contracted at the nodes, streaked, rough, the angles prominent and covered with hard spreading hairs; leaves petiolate, opposite, decussate, spreading, cordate-ovate, reticulate-veined, pubescent on both surfaces, the margins rather unequally crenate-serrate; spikes terminal, solitary, slender; bractlets subulate, longer than the short pedicel; flowers small, solitary; calyx green, channeled, more than twice the length of the bractlets, pubescent with erect hairs; corolla pale-pink, infundibular, pubescent with reflexed hairs, its tube twice as long as the calyx, the limb erect; anthers included; filaments inserted on the corolla-tube; style filiform; stigma hooked, exserted just before the bud fully expands, but afterwards included by the elongated corolla; ovary ovate.

Nothing is known of this species beyond Graham's original description, where he says that "Our plant is branched at the bottom; but as the branches are herbaceous, and stand right up like many stems, without being farther divided, it is possible that both the woody structure, and the branching, may have arisen from the leading shoot having been cut down." He says further that "The species has no beauty, nor does it possess any interest except that it is new. We received the plant from Mr Hogg at New York last spring, under no name, but with the information that it had been procured from Mexico."

Sweet calls it the "Bearded Vervain". Perry says "This is undoubtedly a member of the Section Verbenaca, but the description is too meagre to identify it." She suggests that V. delicatula Mart. & Zucc. may be the same taxon.

xVERBENA BEALEI Moldenke, Phytologia 2: 145. 1946.

Synonymy: Verbena hispida x litoralis Dermen, Cytologia 7: 163, fig. 21, 164, 169, fig. 33—38, 170, 171, & 175. 1936.

Literature: Dermen, Cytologia 7: 163, fig. 21, 164, 169, fig. 33—38, 170, 171, & 175. 1936; Moldenke, Phytologia 2: 145. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 24. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 163 & 197. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2210. 1951; Moldenke, Am. Midl. Nat. 59: 342. 1958; Moldenke, Résumé 223, 366, & 470. 1959.

Illustrations: Dermen, Cytologia 7: 163, fig. 21, & 169, fig. 33—38. 1936.

This is a hybrid between V. hispida Ruíz & Pav. and V. litoralis H.B.K., with intermediate characters. It originated in a garden in Massachusetts in 1936, having been produced artificial-

ly by Dermen in his experimental work on the cytogenetics of Verbena. There is plenty of opportunity for this hybrid to occur in Nature because the two parental species occupy the same geographic areas in Paraguay, in São Paulo, Brazil, and in at least three provinces of Bolivia, 3 of Chile, and 10 of Argentina. It is very possible that some, at least, of the so-called puzzling forms of V. litoralis seen in herbaria represent this hybrid. It is also very possible that V. bangiana also belongs here. V. litoralis is apparently very widespread and variable; it should receive much more intensive study, and when this is done the possibility of hybridity with related species should be kept in mind.

VERBENA BERTERII (Meisn.) Schau. in A. DC., Prodr. 11: 551. 1847.

Synonymy: Verbena erinoides Spreng. ex Hook. & Arn., Bot. Beech. Voy. 41--42 (1830) and 484. 1841 [not V. erinoides Auth., 1959, nor Chod., 1904, nor Lam., 1791, nor Willd., 1947]. Shuttleworthia berterii Meisn. ex Walp., Repert. 4: 13 (1845) and Meisn., Gen. Pl. Comment. 198. 1846. Verbena erinoides Poepp. ex Schau. in A. DC., Prodr. 11: 551, in syn. 1847. Schuttleworthia berterii Meisn. apud C. Gay, Hist. Fis. Chile Bot. 5: 9, in syn. 1849. Verbena erinoides L. ex Lorentz & Niederlein, Exped. Rio Negro 2 (Bot.): 266. 1881. Verbena berterii Schau. apud Jacks., Ind. Kew. 2: 1178. 1895. Verbena berteri Schau. ex Hauman-Merck, Anal. Mus. Argent. Hist. Nat. Buenos Aires 24: 415. 1913. Verbena erinoides Hook. ex Moldenke, Lilloa 6: 332, in syn. 1934. Verbena dissecta Schau. ex Moldenke, Résumé 363, in syn. 1959 [not V. dissecta Morong, 1904, nor Poepp., 1847, nor Spreng., 1959, nor Walp., 1849, nor Willd., 1825]. Verbena erinoides Hook. & Arn. ex Moldenke, Résumé 364, in syn. 1959.

Literature: Feuill., Journ. Obs. Phys. Côtes Orient. [3]: 35, pl. 25, fig. 1. 1725; Hook. & Arn., Bot. Beech. Voy. 41--42. 1830; Maund, Bot. Gard. 5: pl. 106. 1834--1835; Hook. & Arn., Bot. Beech. Voy. 484. 1841; Walp., Repert. 4: 13 & 31. 1845; Meisn., Gen. Pl. Comment. 198. 1846; Schau. in A. DC., Prodr. 11: 551. 1847; C. Gay, Hist. Fis. Chile Bot. 5: 9--10 & 12. 1849; Jacks., Ind. Kew. 2: 1178. 1895; Briq., Ann. Conserv. & Jard. Bot. Genèv. 10: 104. 1907; Hauman-Merck, Anal. Mus. Nac. Nat. Hist. Buenos Aires 24: 415. 1913; Moldenke, Prelim. Alph. List Invalid Names 56. 1940; Moldenke, Lilloa 6: 322. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 42, 74, & 101. 1942; Moldenke, Alph. List Invalid Names 45. 1942; Moldenke, Lilloa 10: 345. 1944; Moldenke, Holmbergia 4: 151. 1945; Moldenke, Bot. Gaz. 106: 162. 1945; Moldenke, Alph. List Cit. 1: 39 & 59 (1946) and 2: 446 & 602. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 50. 1948; Moldenke, Castanea 13: 118. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 101, 163, & 197. 1949; Moldenke, Alph. List Cit. 3: 686, 728, 750, 811, 812, & 940 (1949) and 4: 1017, 1078, 1116, 1175, 1187, 1215, 1251, 1297, 1302, & 1304. 1949; Moldenke, Phytologia 3: 75 (1949) and

3: 290 & 377. 1950; Moldenke, Sp. Subsp. Cont. Mold. Set 45 [3]. 1951;Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2210. 1951; Moldenke, Inform. Mold. Set 46 Spec. 4. 1951; Moldenke, Inform. Mold. Set 48 Spec. [4]. 1954; Moldenke, Inform. Set 51 Spec. 4. 1956; Moldenke, Résumé 84, 121, 223, 358, 363, 364, & 470. 1959; Moldenke, Résumé Suppl. 2: 5 & 9—11. 1960.

Illustrations: Maund, Bot. Gard. 5: pl. 106 (in color) [as V. radicans]. 1834--1835.

Annual or perennial, procumbent or prostrate herb, often slightly woody or suffruticose at the base; stems red, creeping, spreading, ascending at the tips, covered with short white hairs; branches ascending, tetragonal, whitish-hirtous throughout; leaves decussate-opposite, petiolate, pinnately or bipinnately parted or trifid-pinnatifid, attenuate and entire at the base, strigose-hispidulous on both surfaces, the lobes linear or linear-lanceolate to oblong or oblong-lanceolate, short, rather acute or obtuse at the tips, entire or dentate, revolute-margined, the middle lobe 3-dentate; peduncles 6--12 mm. long; spikes very densely capitate, many-flowered, solitary at the apex of the branches, globose, not enlarging after anthesis; bractlets lanceolate or linear-lanceolate, 1/2 to 2/3 as long as the calyx, the outer (lower) ones spreading; calyx green, 6—8 mm. long, white-hirsutulous or hispid-canescent, the teeth unequal, linear, rather obtuse; corolla hypocrateriform, 2--3 times as long as the calyx, varying from yellowish, pinkish, or rose to light lilac, lilac, pale-rose, red-purple, purple, or blue, its tube usually red-violet at the base, very narrow, 10—15 mm. long, the exserted portion densely short-pubescent with white hairs or rarely subglabrate, the limb rather large, often dark-blue and lavender, the throat villous, the lobes 5, emarginate; anther-appendages dorsal, small, included or only very slightly exserted, continuous with the base of the connective, somewhat surpassing the slightly clavate apex of the anthers, usually not conspicuously visible from outside; fruiting-calyx contorted at the apex; cocci 4, 1/3 as long as the calyx, yellowish, terete and slightly striate dorsally, reticulate-rugose at the apex.

The type of this species was collected by Carlo Giuseppe Bertero (no. 744) -- in whose honor it is named -- in Colchagua, Chile, and is deposited in the Meisner Herbarium at the New York Botanical Garden. Schauer cites also Bertero 1390 from Rancagua [Colchagua, Chile], Poeppig 159 from Concan [Valparaiso, Chile], Gaudichaud s.n. and Style s.n. from Chile, and Filter s.n. from Bolivia, all deposited in the DeCandolle Herbarium at the Conservatoire et Jardin Botaniques at Geneva. In Lilloa 6: 322 (1941) I cited Morong 1322 and United States Exploring Exped. [Wilkes] s.n. from Valparaiso and Bridges 602 from Valdivia, but these collections, on further study, have proved to be other species. Likewise, the species has been cited by me in both editions of my Known Geogr. Distrib. Verbenac. and in my Résumé from Junin, Peru, in error. It is said to be cultivated in England, but I have as yet

seen no cultivated material of it.

The species is said by Schauer to be closely related to V. lipozygioides Walp., but is very distinct in the character of its corolla (which he says is apparently whitish) and anthers. He also compares it with V. tenera Spreng., pointing out that it differs from the latter in leaf, flower, and indumentum characters. Gay avers that it is closely related to V. sulphurea D. Don, being quite similar in habit, leaf-form, and the disposition of the inflorescences, but differing in its much shorter and appressed pubescence, rose instead of yellow flowers, and above all in its anther-appendages being not visibly exserted. He notes that "El señor Schauer le da ademas como carácter propio el de tener el caliz contornado sobre el fruto, pero esta particularidad se observa tambien en las V. sulfurea, erinoides, etc."

V. berterii has been found growing as a spreading mat among grasses and other vegetation on hills and mountainsides, in bare or dry sunny places, on bare or dry shrubby hillsides, in direct sunlight on moist puna, in rocky sandy places along streams, on steep west-facing rocky slopes, and on dry exposed clay banks in the shade of larger plants, at altitudes of 20 to 3300 meters, blooming from August to April. It is said by Biesa to be abundant at Romeral in Santiago province. Common names reported for it are "Chilean verbena" and "hierba del incordio", the latter name being also applied to V. origenes R. A. Phil. and V. laciniata (L.) Briq.

Herbarium material has been abundantly misidentified and distributed as V. erinoides Lam., V. laciniata (L.) Briq., V. lamberti Sims, "Verbena lambertii aff.", V. porrigenes R. A. Phil., V. porrigens R. A. Phil., and V. radicans Gill. & Hook. Hauman-Merck (1913) cites his no. 350 and Hier-Berg 125 from hills near the Río Negro, Argentina. He comments that it does not seem to occur on the plateau. I have not seen these collections and therefore cannot say if they are correctly identified. Lorentz & Niederlein (1881) also record the species [as V. erinoides L.] from Río Negro, but they may be referring to V. laciniata (L.) Briq.

In all, 98 herbarium specimens, including the types of most of the names involved, and 5 mounted photographs and illustrations have been examined by me.

Citations: PERU: Ayacucho: R. D. Metcalf 30322 (W--1834982). Huancavelica: R. D. Metcalf 30267 (W--1834979). CHILE: Aconcagua: E. M. Kausel 2558 (N), s.n. [Zapallar, 10.X.1948] (N); Looser 5504 (N), 5505 (N); Schwabe 120 (N). Antofagasta: Barros Valenzuela 8005 (N); Werdermann 789 (Ca--289369). Bío-Bío: Dusén s.n. [29.X.1896] (S). Colchagua: Bertero 744 [Macbride photos 7853, in part] (Kr—photo of isotype, M--type, N—photo of isotype), s.n. [Racangua] (Br); Collector undesignated 2 (N). Concepcion: Barros Valenzuela 8029 (N); Junge 971 [Herb. Jard. Bot. Rio Jan. 28790] (N); Skottsberg & Skottsberg 1491 (Go, S). Co-

quimbo: Biese 2238 (N); Skottsberg & Skottsberg 843 (N); Worth & Morrison 16604 (Ca--631791). Curicó: Barros Valenzuela 8035 (N). Maule: G. Kausel s.n. [Constitución, 2--9.2.1949] (Ku); C. Reiche 9 (N). Nuble: Barros Valenzuela 8054 (N); Puga 8 (N). Santiago: Biese 21 (N, W--1931303); C. Gay 1084 [18; Herb. Mus. Nac. Hist. Nat. Chile 54734] (N); G. T. Hastings 190 (Ca--66365); E. M. Kausel 3064 (N), 3147 (N); Looser 4222 (N), 5507 (N), 5509 (N), 5511 (N); H. N. Moldenke s.n. [Kausel 2679] (N); Moldenke & Moldenke 19758 (Es, Es, Lg, Mg, Mr, N, No, Ot, Sm); J. L. Morrison 16771 (Ca--632907); R. A. Philippi 473 (S); Skottsberg & Skottsberg 975 (Go, S). Talca: Collector undesignated 7 (N). Valdivia: Bridges s.n. [Valdivia, 1862] (M). Valparaiso: Barros Valenzuela 8036 (N); K. Behn s.n. [14 Sept. 1930] (Ca--446699), s.n. [3-XI-1940] (N); Bertero 1389 [Macbride photos 7853, in part] (Kr--photo, M, N--photo); Bridges s.n. (Br); Günther & Buchtien s.n. [IX.1928] (Ew, S); Killip & Pisano 39710 (N); Moldenke & Moldenke 19764 (N), 19936 (B, Bs, Es, F, Fy, Hk, Hw, Le, Lg, Lm, Mg, Mm, Mr, N, No, Ok, Ot, Rs, S, Sm, Sm, Ss, Ss, Z); Morong 1322 (C); Skottsberg & Skottsberg 930 (Go, N, S); Werdermann 1829 (S); Wilkes s.n. [Valparaiso] (T). Province undetermined: Bridges s.n. [Chile] (S); Cuming 519 (Br), s.n. [Chile, 1835] (Br); C. Gay 744 [Chile, 1828--1834] (Br), 792 [Chili, 1839] (Br); Herb. Mus. Nac. Santiago 7 (N); Herb. Sullivant s.n. (Pa); Petré s.n. [Chili, 1818] (S). MOUNTED ILLUSTRATIONS: Maund, Bot. Gard. 5: pl. 106 (N).

VERBENA BERTERII f. ALBIFLORA Moldenke, Phytologia 3: 278. 1950.

Literature: Moldenke, Phytologia 3: 278 & 290 (1950) and 5: 96. 1954; Moldenke, Résumé 121 & 470. 1959.

This form differs from the typical form of the species in having uniformly white corollas.

The type of this form was collected by Ellsworth Paine Killip and Edmundo Pisano (no. 39711) on an open hillside, at an altitude of about 600 meters, between Curacavi and Casablanca, on the western slope of the Cuesta de Zapata, Valparaiso, Chile, on November 3, 1948, and is deposited in the Britton Herbarium at the New York Botanical Garden.

Schauer described V. berterii as having "apparently whitish" flowers, and Looser reports that he found white and violet flowers "on the same stem". I believe, however, that these are merely cases of fading of the flowers with age. In the present form the corollas are always completely and uniformly white. Three herbarium specimens, including the type, have been examined by me.

Citations: PERU: Junín: Kalenborn & Kalenborn 50 (N). CHILE: Malleco: Kunkel 43 (Z). Valparaiso: Killip & Pisano 39711 (N--type).

xVERBENA BINGENENSIS Moldenke, Phytologia 2: 145--146. 1946.

Literature: Moldenke, Phytologia 2: 145--146. 1946; Moldenke, Alph. List Cit. 2: 494 (1948) and 4: 981. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 26 & 197. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Am. Midl. Nat. 59: 342-343. 1958; Moldenke, Résumé 32 & 470. 1959; Moldenke, Résumé Suppl. 2: 10 & 12. 1960.

Medium-sized herb; stems medium, slightly woody at the base, obtusely tetragonal, brown, often blotched, rather abundantly pubescent with soft weak white hairs about 1 mm. long which wear off in age; nodes annulate; principal internodes short, 2.5—5 cm. long; branches numerous, slender, more sharply tetragonal and more densely white-pubescent with soft hairs; leaves decussate-opposite; petioles short, 2—5 mm. long, winged, grading imperceptibly into the blade; leaf-blades firmly chartaceous, brittle in drying, very rough above (when the finger is drawn downwards) and slightly so beneath, ovate in outline, to 5 cm. long, mostly about 1—1.5 cm. wide, the largest to 3 cm. wide at the base, irregularly incised-laciniate, the two lowest segments often lobe-like and spreading on the largest leaves, abundantly sub-strigose-pubescent on both surfaces, the hairs very variable in length beneath and densest on the venation; venation impressed above, prominent beneath; inflorescence abundant, simple or few-branched, in the axils of all the upper leaves; peduncles slender, 1—5 cm. long, sharply tetragonal, densely short-pubescent; rachis slender, densely pubescent with rather stiff forward-pointing white hairs of various lengths; spikes to about 10 cm. long, densely many-flowered, apparently setting seed very poorly, the mature calyxes rather distant; bractlets large and conspicuous, very variable in size, 4—8 mm. long, lanceolate, the lowermost slightly foliaceous, attenuate-acuminate at the apex, about 1 mm. wide at the base, more or less strigose, not keeled except when very old, mostly greatly exceeding the calyx; calyx 3—4 mm. long, densely strigose; corolla-tube slightly surpassing the calyx, densely puberulent on the outer surface, its limb about 2 mm. wide.

The type of this natural hybrid was collected by Wilhelm N. Suksdorf in bottomlands at Bingen, Klickitat County, Washington, on July 9, 1898, and is deposited in the Britton Herbarium at the New York Botanical Garden. It was identified originally as V. officinalis L. The plant appears to be a natural hybrid between V. bracteata Lag. & Rodr. and V. lasiostachys var. septentrionalis Moldenke. The two parental taxa grow together in at least 9 counties of California, but thus far only one supposed parent, V. bracteata, has been seen by me from Klickitat County, Washington, where Suksdorf collected the type. This fact militates against the hypothetical second parent, but possibly more intensive collecting may reveal its presence there. Suksdorf was a very intensive collector and one would suppose that he would have collected material of both parents if they occurred there in the bottomlands at Bingen in 1898 when he collected the type of the supposed hybrid. The hybrid nature of this plant, there-

fore, and, if it is really a hybrid, the exact identity of the second parent, are still in doubt. An experimental geneticist might try to make the suggested cross and see if the result resembles this plant. It is know thus far only from the type collection, of which 3 herbarium specimens, including the type, have been examined by me.

Citations: WASHINGTON: Klickitat Co.: Suksdorf s.n. [Bingen, July 9, 1898] (Ca—755099—isotype, N—type, Pl—138357—isotype).

VERBENA BIPINNATIFIDA Nutt., Journ. Acad. Nat. Sci. Philad. 2: 123. 1821.

Synonymy: Glandularia bipinnatifida (Nutt.) Nutt., Trans. Am. Phil. Soc., new ser., 5: 184. 1837. Verbena bipinnatifida (Nutt.) Schau. in A. DC., Prodr. 11: 553. 1847. Glandularia bipinnatifida Nutt. apud Schau. in A. DC., Prodr. 11: 553, in syn. 1847. Verbena bipinnatifida Schau. apud Jacks., Ind. Kew. 2: 1178. 1895. Verbena pinnatifida Schau. ex Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148, in nota. 1895 [not V. pinnatifida Lam., 1791, nor M. E. Jones, 1941]. Verbena demareei Moldenke, Am. Midl. Nat. 24: 752. 1940. Verbena bipennatifida Nutt. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena bipinnalifida Nutt. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena bipinnatifida Michx. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena bipinnatifidus Nutt. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena pinnatifida Nutt. ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Verbena bipiinnatifida Nutt. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena artemisiaefolia Clemens ex Moldenke, Résumé 358, in syn. 1959. Verbena bi-pinnatifida Nutt., in herb. Verbena bipiunatifolia Nutt., in herb.

Literature: Nutt., Journ. Acad. Nat. Sci. Philad. 2: 123. 1821; Nutt., Trans. Am. Phil. Soc., new ser., 5: 184. 1837; Eaton & Wright, N. Am. Bot., ed. 8, 470. 1840; Walp., Repert. 4: 33. 1845; Schau. in A. DC., Prodr. 11: 553. 1847; A. Gray, Syn. Fl. N. Am. 2 (1): 337. 1878; Wats. & Coult. in A. Gray, Man., ed. 6, 402. 1890; Coult., Contrib. U. S. Nat. Herb. 2: 328. 1892; Hook. & Jacks., Ind. Kew. 1 (2): 1032 (1893) and 2: 1178. 1895; Hitchc. & Norton, Bull. Kans. Agric. Sta. 57: pl. 13, fig. 140 (1896) and 66: pl. 12, fig. 140. 1897; Britton & Br., Illustr. Fl., ed. 1, 3: 72, fig. 3064. 1898; A. S. Hitchc., Fl. Kans. pl. 15. 1899; Small, Fl. Southeast. U. S., ed. 1, 1010. 1903; Briq., Ann. Conserv. & Jard. Bot. Genèv. 10: 103. 1907; Robinson & Fern. in A. Gray, New Man. Bot., ed. 7, 689 & 924, fig. 880. 1908; M. A. Day, Check List 128. 1908; Britton & Br., Illustr. Fl., ed. 2, 3: 97, fig. 3559. 1913; Small, Fl. Southeast. U. S., ed. 2, 1010. 1913; E. D. Schulz, 500 Wild Fls. 177—178. 1922; Olmstead, Coville, & Kelsey, Stand. Pl. Names, ed. 1, 521. 1924; E. D. Schulz, Texas Wild Fls. 335—336. 1928; Seymour, Host Ind. Fungi N. Am. 587. 1929; Rydb., Fl. Prairies & Plains 678—679. 1932; Perry, Ann. Mo.

Bot. Gard. 20: 243, 244, 248, 311, 323--325, 328, 331, 337, & 355. 1933; E. J. Palmer, Journ. Arnold Arb. 15: 133. 1934; L. H. & E. Z. Bailey, Hortus, new rev. ed., 631--632. 1935; L. H. Bailey, Cat. Florists mss. 1935; E. J. Palmer, Ann. Mo. Bot. Gard. 22: 629. 1935; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Moldenke, Annot. List 108 & 113. 1939; Moldenke, Suppl. List Common Names 20. 1940; Moldenke, Prelim. Alph. List Invalid Names 26. 1940; Gates, Fl. Kans. 190, map 1066. 1940; Deam, Fl. Indiana 795, 1083, & 1232. 1940; Moldenke, Suppl. List Invalid Names 7, 8, & 10. 1941; Gates, Weeds Kans. 42 & 219. 1941; Moldenke in Lundell, Fl. Texas 3 (2): 18, 38--40, & 42. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 4--6, 8--12, 14, 18, 74, & 101. 1942; Moldenke, Alph. List Invalid names 25, 45, & 49. 1942; Kearney & Peebles, Misc. Publ. U. S. Dept. Agr. 423: 764. 1942; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 221 & 306. 1942; Schnack & Covas, Darwiniana 6: 475. 1944; Moldenke, Phytologia 2: 70, 71, 77, 82, 84, 87, 114, & 126--127. 1945; Moldenke, Bot. Gaz. 106: 161. 1945; Moldenke, Castanea 10: 37--40. 1945; Moldenke, Am. Journ. Bot. 32: 610. 1945; G. L. Fisher, Am. Bot. Exchange List 1946; Moldenke, Alph. List Cit. 1: 4, 9, 15--17, 23, 27, 28, 31, 32, 35, 36, 38, 42, 43, 46, 47, 49, 52, 67, 74, 93, 94, 97, 102, 108--110, 115, 116, 119, 125--127, 130, 140, 141, 143, 144, 154, 157--159, 161, 162, 166, 174, 178, 183, 193, 194, 197, 199--202, 204, 209, 211, 213, 217, 225, 226, 231, 240, 242-244, 250, 255--257, 267, 270, 276, 280--282, 288, & 297. 1946; Merr. & Reeder, Bartonia 24: 76. 1946; Tolstead & Cory, Field & Lab. 14: 39 & 60. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 22. 1947; Moldenke, Phytologia 2: 328, 329, 347, & 383 (1947) and 2: 159--160. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 44 & 55. 1948; Moldenke, Wrightia 1: 231--232. 1948; Moldenke, Castanea 13: 112 & 113. 1948; Moldenke, Alph. List Cit. 2: 356, 360, 391, 393, 397, 398, 402--407, 439, 450--455, 457, 470, 472--476, 478--481, 492, 494, 497, 502, 505, 507, 510, 511, 514--518, 520--522, 525--527, 529, 536, 538, 545, 546, 548--550, 559, 560, 574, 576, 581, 585, 588, 593, 594, 596--598, 604--607, 617, 621, 630--632, 639, & 640 (1948), 3: 664, 665, 667, 674, 678--683, 698, 701, 702, 709, 713, 715, 717--719, 722, 723, 726, 729, 743, 745, 749, 754, 759, 768--771, 780, 783, 784, 788, 789, 791, 792, 795--799, 802, 803, 806, 808, 821, 822, 824, 828, 831, 832, 838, 839, 841--844, 850--853, 855--857, 870, 873, 877, 878, 880, 882--887, 893, 895, 903, 905, 914, 917, 927, 931--934, 939, 946, 948, 952, 953, 962, 963, 970, 971, 973, 976, & 978 (1949), and 4: 979, 986, 987, 990--996, 998, 1003, 1004, 1013, 1060, 1068, 1085, 1095, 1107--1109, 1111, 1113, 1117, 1121--1123, 1125, 1129, 1135, 1138-1140, 1142, 1147--1150, 1162, 1163, 1168, 1170--1174, 1176, 1179-1181, 1183, 1187, 1191, 1199, 1202, 1205, 1207, 1210, 1212, 1213, 1216, 1217, 1220, 1221, 1225, 1226, 1229, 1230, 1233, 1237--1239, 1241, 1243, 1247, 1260, 1283, 1289, 1290, 1292, & 1298. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 8, 11, 16--21, 23, 25, 26, 32, 163, & 197. 1949; Moldenke, Phytologia 3: 72, 79, 131, & 132. 1949; Moldenke, Am. Wild Fls. 291 & 450, pl. xxx. 1949; Deam, Yuncker, & Friesner, Proc. Ind. Acad. Sci. 59: 51.

1950; Fern. in A. Gray, Man. Bot., ed. 8, 1209, 1211--1212, & 1612, fig. 1470. 1950; Moldenke, Phytologia 3: 374 (1950) and 3: 450. 1951; McDougall & Sperry, Pl. Big Bend Natl. Park 146. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2210. 1951; Moldenke, Inform. Mold. Set 46 Spec. 4. 1951; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 127, 133, & 134. 1952; Moldenke, Phytologia 5: 22 & 94. 1954; Moldenke, Inform. Mold. Set 49 Spec. 3. 1954; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 2, 3: 127, 133, & 134. 1958; Moldenke, Am. Midl. Nat. 59: 357. 1958; Moldenke, Résumé 11, 14--16, 20--25, 28, 31, 38, 223, 295, 358, 363, 372, & 470. 1959; Moldenke, Résumé Suppl. 2: 3, 10, & 12. 1960; Lewis & Oliv., Am. Journ. Bot. 48: 639--641. 1961.

Illustrations: Hitchc. & Norton, Bull. Kans. Agric. Sta. 57: pl. 13, fig. 140 (1896) and 66: pl. 12, fig. 140. 1897; Britton & Br., Illustr. Fl., ed. 1, 3: fig. 3064. 1898; A. S. Hitchc., Fl. Kans. pl. 15. 1899; Robinson & Fern. in A. Gray, New Man. Bot., ed. 7, fig. 880. 1908; Britton & Br., Illustr. Fl., ed. 2, 3: fig. 3559. 1913; E. D. Schulz, Texas Wild Fls. 336. 1928; Moldenke, Am. Wild Fls. pl. xxx. 1949; Fern. in A. Gray, Man. Bot., ed. 8, fig. 1470. 1950; Natl. Wildlife Fed. Wash. 1950 Nature Stamps, wild verbena (in color). 1950; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 134 (1952) and pr. 2, 3: 134. 1958; Lewis & Oliv., Am. Journ. Bot. 48: 640. 1961.

Coarse annual or perennial herb, sometimes erect or ascending and to 6 dm. tall, more often procumbent or nearly prostrate with a spread of 9 dm. or more, more or less diffusely many-branched from the base; roots fibrous; stems at first sprawling or procumbent, later loosely ascending, occasionally rooting at the lower nodes or from subterranean branches, tetragonal, hispid-hirsute; branches tetragonal or sharply tetragonal, spreading or ascending, about 2 dm. long, with erect tips, rather densely hirsute with canescent hairs 1--1.5 mm. long and standing at right angles to the stems; leaves decussate-opposite, 2--10 cm. long, usually with several much reduced ones fasciculate in their axils, petiolate; petioles 3--10 mm. long, alate-margined, hirsutulous; leaf-blades thin-chartaceous, uniformly green on both surfaces, ovate in outline, 2--6 cm. long and wide, bipinnatifid or tripartite with the divisions again more or less bipinnatifid, sometimes 2- or 3-cleft, often very deeply 3-parted to the base with each division pinnatifid and the lobes linear or oblong, glabrous above and hirsutulous along the margins and venation beneath or appressed-hirsute on both surfaces, at times revolute along the margins, all the lobes usually linear or narrowly oblong and subacute, often sharply cut and toothed; inflorescence spicate, terminal, pedunculate; peduncles 2--7 cm. long, densely canescent-hirsute like the stems; spikes at first fascicle-like or subcapitate, later elongating to 8 cm., very densely many-flowered, about 3.5 cm. wide during anthesis (1.5 cm. wide exclusive of the corollas), always elongate when in fruit; bractlets narrow-lanceolate, 8--9 mm. long, mostly longer than the calyx, linear-subulate and long-attenuate to the setaceous apex,

densely canescent-hirsutulous or ciliate along the margins; flowers with an uncommonly large amount of nectar, fragrant with a slight sweet odor or odorless; calyx 6--7.5 mm. long, short-pubescent or sparsely short-hirsutulous, its teeth setaceous, 2--3 mm. long; corolla hypocrateriform, varying from pink, pink-purple, or pinkish-violet to blue, bluish, bluish-lavender, lavender, dark-lavender, deep-lavender, pale-lavender, lilac, purplish, light-purple, rose-purple, reddish-purple, bluish-purple, or purple, sometimes bluish-violet, violet, magenta, or red, or deep-pink tinged with lavender, its tube about 10 mm. long, usually about 1 1/2 times the length of the calyx, pubescent on the outer surface, the limb 8--13 mm. wide, the lobes emarginate; staminal glands much smaller and considerably longer than the anther-cells; fruiting-calyx 8.5--10 mm. long, pubescent, hispid-hirsute along the veins, the teeth very slender, unequal, subulate-setaceous from a broader base; cocci cylindric, 2--3 mm. long, slightly broadened at the base, reticulate-scrobiculate above, striate toward the base, the commissural face muricately scabrous; chromosome number: n = 10 (Solbrig) or 15 (Lewis & Oliver).

The type of this common species was collected on sunny limestone hills along the Red River, Arkansas, by Thomas Nuttall and is probably deposited in the herbarium of the Academy of Natural Sciences at Philadelphia. The type of V. demareei was collected by Delzie Demaree (no. 17198) -- in whose honor it was named -- in chalk and marl ditches at Okolona, altitude 350 feet, Clarke County, Arkansas, on June 30, 1938, and is deposited in the Britton Herbarium at the New York Botanical Garden. This Demaree collection combines the ordinary leaf-characters of V. bipinnatifida with the large flowers of V. canadensis (L.) Britton and may possibly prove to be a natural hybrid between them if the corolla-limb, as Perry states, of V. bipinnatifida varies only from 8 to 10 mm. in width. Those specimens with the limb up to 13 mm. in diameter would then fall into the V. demareei category. It is possible, however, that the apparent corolla-limb size may be due in some cases to an accident in pressing. The actual known hybrid between the two species has been named xV. oklahomensis Moldenke. If V. demareei should prove to be this same hybrid, it would not affect the nomenclature of the hybrid, since V. demareei was proposed as a true species. Demaree 16114, identified and labeled by the collector as "Verbena demareei Moldenke TYPE coll.", and probably collected from the type colony, appears plainly to be V. bipinnatifida. Abnormally large corollas are seen also on one branch of Carleton s.n. [June 14, 1886] from Cloud County, Kansas.

As is to be expected in the case of a widespread species such as this one, collectors have found V. bipinnatifida in a great variety of habitats. It is found in clayey or sandy loam, dry loam, black or black calcareous soil, dark or black loam, rocky or sandy clay soil, gravelly sandy or dry sandy soil, limestone soil, red clay or red sandy soil, shallow xeric rocky limestone

soil, red sandy or black waxy calcareous soil, granitic gravel, volcanic soil, Beaumont clay, Austin chalk, and Woodford chert, and in both dry and moist soil, in sandy clay of rich meadows and in red sandy soil of overgrazed prairies. It inhabits ridgetops, rocky or limestone hillsides, rocky oak slopes, foothills, sand hills, xerophytic limestone outcrops, the tops and sides of xeric plateaus, dry gravelly hills, stony or dry rocky limestone slopes, dry sandy hillsides, rock quarries, dry clay hills, and exposed xeric outcrops, open or shortgrass prairies and plains, mesquite savannas, open ground and fields in general, pastures, calcareous prairies, sandy fields, fallow blackland prairies, weedy chalky old fields, old or waste fields, fallow fields, the edges of cornfields, low waste places or waste places in general, mesquite prairies and pasturelands, open grasslands, newly plowed land, meadows, sandy plains, dry calcareous pastures, and arid aeolian deposits. It is to be expected along gravel or calcareous roadsides, dry land or sandy roadsides, roadsides in general, and roadside ditches, in vacant lots with somewhat rocky soil, lake beds, the banks of streams, the loamy clay of prairies, the green edges of dried-up streams, along railroad beds and railroad rights-of-way, on gravel sandbars and in gravel pits, on rolling or broken plains, on rocky slopes and prairies and along sandy roadsides in prairieland, on dry banks, blackland and disturbed prairies, lawns and gardens, valleys, thin black soil over limestone, open woods, yellow pine forests, and open sandy meadows in limestone hills. Collectors have found it in xeric pastures without crops, on open xeric calcareous hilltops, and in xeric overgrazed pastures, in stony pinelands, and on canyon slopes in pine forests, in chalk and marl ditches, near running streams and in red river bottoms, in muddy depressions on plains and depressions in prairies, on high limestone prairies and limestone hilltops, in open dry pastures and rocky sunny fields, in canyons and on black rocky clay prairies, in rocky xeric limestone gullies and in open rocky meadows, in rolling antidesitic pinelands and sedimentary badlands, on open mesas and flood plains, and in clearings in woods. It is said to thrive in the shallow phase of the Houston Black Clay and to be occasional in ungrazed parks, characteristic of open ground, fields and uplands, dry meadows, rocky prairies, and high or broken plains, often in limestone soil mixed with sand.

It is found on hillsides under oaks (Quercus) and in rich cork elm (Ulmus thomasi Sarg.) — hickory (Carya) — oak woods. Ruth reports it as "very common on cultivated and uncultivated ground throughout" Tarrant County, Texas, and, on another label, as "very common throughout the state". Smith reports it as "infrequent" in Sonora, Mexico. Molohon notes that in Gila County, Arizona, it is found on steep rocky slopes in Leptochloa-Verbena-Epicampes formations, flowering from June to September, and fruiting from July to October. Hopkins has found it on plateaus on top of dry sterile sandstone dunes in association with mesquite and cactus in Jackson County, Oklahoma. It has been found

commonly on the Viola and Arbuckle limestone formations in Oklahoma. Warnock & McBryde describe it as "frequent" in Terrell and Val Verde Counties, York as "common" in Travis County, and Williges as "frequent on undisturbed caliche" in San Patricio County, Texas. Turner & Johnson encountered it in native grassland on black waxy soil, Ball in limestone and black soil along roadsides, Smith in "clay and sand", Webster on a cedar-sofol mesa top, and Barkley, Rowell, & Webster in moist sandy loam in a bottom covered by pine-juniper woodland. King describes it as "common in open sun in fields and wooded areas" in Hays County, while Van Vleet affirms it to be "abundant in full sun, red sandy clay" in Dallas County, Texas; Horr encountered it in dry loam soil in Kansas. In Jalisco it grows, according to Barkley, Webster, & Rowell, in volcanic soil on mountainsides.

Kruckeberg says that it occurs in the yellow pine - douglas-fir - Gambel oak association in Arizona, while Cutter found it in an open pasture at the entrance to a skunk (Mephitis) den. Cory reports it as "frequent on roadsides" in Tom Green County, Texas, while Tolstead describes it as "a pioneer in abandoned fields". Johnson found it "frequent locally in dry sandy loam soil along edge of cultivated fields" in Runnels County and "frequent in dry clay loam associated with Chloris verticillata, Setaria macrostachya, and Cenchrus in Karnes County, Texas. Tharp, Turner, & Johnston found it on blackland prairie in Upper Cretaceous marls on top of Marquez salt dome. Clemens describes it as a plant of the Tropical Life Zone in Texas, Young says it is "abundant on prairies" in Travis County, and Bebb reports it as "common" in Bexar and Grayson Counties of the same state. It has been collected at altitudes of 30 to 10,500 feet, blooming from February to December, and fruiting from March to December. Deam (1940) states that it has been reported from the Calumet District of Indiana, growing on railroad embankments, and he regards it as a "migrant" there. Deam, Yuncker, & Friesner (1950) record it from Orange County, Indiana. I have not as yet seen the specimens on which these records are based.

Common names for the species are "common verbena", "hairy verbena", "large-bracted vervain", "mat verbena", "mat vervain", "purple verbena", "small-flowered verbena", "smallflowered verbena", "sweet William", "verbena", "vervain", and "wild verbena". The name recommended by "Standardized Plant Names" is "Dakota verbena".

Herbarium specimens have been abundantly misidentified and distributed in herbaria as V. ambrosiaefolia Rydb., V. ambrosiifolia Rydb., V. ambrosiifolia Rydb., V. angustifolia Michx., V. aubletia L., V. bipinnatifida var. latilobata Perry, V. bracteata Lag. & Rodr., V. bracteosa Michx., V. canadensis (L.) Britton, V. ciliata Benth., V. ciliata var. longidentata Perry, V. drummondi Baxt., V. drummondii (Lindl.) Baxt., V. halei Small, V. multifida Pavon, V. multifida Ruíz & Pav., V. pubera Greene, V. pumila Rydb., V. racemosa Eggert, V. teucriifolia Mart. &

Gal., V. wrightii A. Gray, and even Abronia umbellata Lam., Geranium caroliniamum L., and Teucrium laciniatum Torr.!

On the other hand, the A. Nelson 11307, Eastwood 140, Wooton 363, and Wynd & Mueller 176 distributed as V. bipinnatifida are actually V. ambrosifolia Rydb.; Hartman 906 is the type collection of V. bipinnatifida var. latilobata Perry; Friesner 22735 is V. canadensis (L.) Britton; Deaver 3134, W. W. Jones s.n. [Prescott, May 30, 1922], Mexia 2537, A. Nelson s.n. [Schnebly Hill, 5/23/40], Edw. Palmer 345, Purpus 1095 and 4524, and E. Wilkinson s.n. [Santa Eulalia Plains, Sept. 26, 1885] are all V. ciliata Benth.; J. B. Davy 21, Forrer s.n. [Sierra Madre, Sept. & Oct. 1881], A. A. Heller 1385, and M. S. Young 113 are all V. ciliata var. longidentata Perry; Purpus 4598 is V. elegans H.B.K.; K. Brandegee s.n. [Barnwall, May 15, 1911], Epling & Stewart s.n. [Patagonia, Sept. 4, 1936], Ferris 9933, Goodding 645, E. R. Johnson 962, Nelson & Nelson 1364 and 1543, and Toumey s.n. [Galliuro Mts.] are all V. gooddingii Briq,; M. Hopkins 6094 is xV. oklahomensis Moldenke; G. T. Robbins 2449 is V. pumila Rydb.; and A. Nelson 11388, 11401, 11566, and 11757, H. H. Rusby 337, and Snow s.n. [Santa Fe, Aug.] are all V. wrightii A. Gray.

As to the occurrence of V. bipinnatifida in Utah, a letter received by me from Seville Flowers, Professor of Botany at the University of Utah, dated January 25, 1955, says "Dr. John D. Spikes handed me your letter inquiring about Verbena bipinnatifida in Utah. We have nothing in our herbarium from Utah nor from the borders of the states surrounding us. Dr. Cottam and I do a good deal of collecting throughout the state and in more than thirty years have not spotted this species. If it occurs here it must be rare." My own recording of it from Utah in my Known Geographic Distribution of the Verbenaceae (1942 & 1949) and Résumé (1959) was based on M. E. Jones s.n. in the Utah State Agricultural College herbarium, but on re-examination I now regard this specimen as representing V. ambrosifolia and as actually being a part of his no. 122 from El Paso County, Colorado.

Dr. LeRoy H. Harvey, Curator of the Herbarium at Montana State University, in a letter to me dated February 15, 1955, reports that he has checked through the herbarium there and finds no Montana specimens of this species and "from knowledge of other reports from this state, I am not surprised that it is an error."

Over s.n. [July 14, 1914], Smith & Rinehart 82, C. S. Wallis 4944-1, and Cutter 33 are all mixtures with V. bracteata Lag. & Rodr., Benson 9573 is a mixture with V. macdougalii Heller, Hawkins 37 is a mixture with V. pumila Rydb., and Pitts s.n. [4/19/15] is a mixture with xV. oklahomensis Moldenke, while Fleming 132 is mixed with material of Melosmon laciniatum (Torr.) Small, Herb. Harvey s.n. [h. R. P., Julio 1843] is mixed with Dracoceph-

alum sp., and Rydberg & Imler 1166 is a mixture with Hedeoma camporum Rydb. The Osterhout s.n. (Ok--20406) from Norman, Oklahoma, distributed as Verbena hipinnatifida, is actually Phlox pilosa var. fulgida Wherry. The specimen from the Delhi University Herbarium in the Göteborg herbarium is something brassicaceous. M. S. Young 113 has the leaf-characters of V. ciliata var. longidentata and may actually prove to belong to that taxon. The G. J. Goodman 5286 collection cited below bears striking resemblance to V. bipinnatifida var. latilobata.

The Lundell & Lundell 10363 cited by me in the "Flora of Texas" is actually V. ciliata var. longidentata. The Small & Wherry 11968, cited below from Bexar County, may actually have been collected in some other county of Texas, since its label says merely "San Antonio to Austin" and Dr. Small's original field book gives no further information. Lindheimer 1072 and 1073, cited from Comal County, may actually be from Bexar or Comanche Counties -- the label merely says "Comanche Spring: New Braunfels, etc.", but Cory is of the opinion that they came from Comal County. Palmer 447, cited by me from Caddo County, Oklahoma, has a label inscribed "between Ft. Cobb and Ft. Arbuckle". The Tracy & Earle 106 cited here is not the true no. 106, which is the type collection of V. inconspicua Greene and very different in many characters. The H. W. Graham 7-14-2, cited below from Santa Cruz County, Arizona, is inscribed "Santa Rita Mts.", so could actually have come from Pima County. Ruth 107 has labels in some herbaria that originally were inscribed "Plants of Tennessee", but the collections seem definitely to have been made in two Texan counties.

Gentry, in his "Rio Mayo Plants", lists V. bipinnatifida from southeastern Sonora and cites his no. 2122 as a perennial bushy herb infrequent on a shady slope at 5000 feet altitude. Benson found the species both in the Transition and the Upper Sonoran lize zones in Arizona. Warnock describes it as "infrequent in limestone soil" in Burnet County, Texas. Gates 16666 and 16684 represent a very canescent form, as does also one stem on a sheet of no. 16492 in the Kansas State College herbarium.

The A. S. Hitchcock s.n. [Winona, May 1895] and E. Bartholomew s.n. [Rockport, June 12, 1889] were erroneously cited in the "Kansas Flora" as V. canadensis (L.) Britton. Stratton 4302 looks a bit like xV. oklahomensis. Forrer s.n. is also atypical -- Perry identified it as var. latilobata, but the leaves are not broadly lobed. Pringle s.n. [April 13, 1881] is also anomalous -- it has much of the aspect of V. gooddingii Briq. Hinton 13125 greatly resembles V. ciliata var. longidentata Perry.

The "March 25, 1817" date on the E. D. Schulz specimen in the University of Michigan herbarium is surely erroneous, yet someone has deliberately emphasized it by going over it with a pen. The collector's name of Nickels s.n. in the University of Pennsylvan-

ia herbarium is there misspelled "Nickles". C. B. Wolf 2490 looks much like V. ciliata var. pubera (Greene) Perry, while Peebles & Fulton 11489 in the herbarium of the United States Field Station at Sacaton was first identified as V. ciliata var. pubera, then as V. wrightii A. Gray, and finally as V. bipinnatifida. The Römer s.n. in the herbarium of the California Academy of Sciences, cited below as from Brazos County, Texas, may well be from another county since its label merely states "Colorado & Brazos rivers" Berlandier 1449 is labeled "Bejar a Austin Mexico", but probably was collected in Travis County, Texas. Carlson s.n. [Bisbee, June 2, 1915] is sterile, but I think that it is this species, in spite of the fact that Kearney feels that it is V. ciliata Benth.

Whitehouse 9589 was collected from "one rootstock which has lived through the winter". Wiegand says that the species is "frequent on grass plains" in Cochise County, Arizona. Runyon says "fls. paniculate, not odorous; bark green" and that it is abundant in Cameron County, Texas, where "it covers large areas of open ground". Bailey found it "erect in grass and somewhat prostrate at base", while Ferris reports that in Cochise County it forms a groundcover with Helenium hoopesii A. Gray, Delphinium, Artemisia, and Pteris in pine forests. Stanford, Retherford, & Northcraft found it in Coahuila in playa valleys with considerable drainage from the surrounding hills, with Larrea and Acacia, and with herbaceous weeds common. Morgan found it growing with Bermuda-grass [Cynodon dactylon (L.) Pers.] in Oklahoma.

In regard to his no. 186, Reeves says "most specimens were forked", while Gates refers to the species as a hemicryptophyte and says that it grows on rocky prairies and dry soil on the plains in the western three-fourths of Kansas. The Alabama, Mississippi, and other far eastern records are all doubtless due to introduction from farther west, as, indeed, was pointed out by E. J. Palmer in 1935. That the species is considerably cultivated, and could escape from gardens in suitable localities, is indicated by the fact that Bailey's manuscript "Catalogue of Florists Handling Verbenaceae" lists W. A. Bridwell, Forestburg, Texas, Claude A. Barr, Prairie Gem Ranch, Smithwick, S. D., and Cronamere as offering its seeds. It is grown as an annual in the trade, and has been in cultivation since 1819. The specific name is often capitalized, for no valid reason. The species is often infested by the fungi Phyllosticta texensis Seaver and P. verbenicola Tharp.

Perusal of the accompanying distributional map will indicate a most remarkable disjunct or "spotty" distribution. This, I feel sure, is due to inadequate collecting. Also, in spite of the fact that I have examined over eleven hundred herbarium specimens of the species, there are still numerous institutions in the region which have not submitted their material to me for checking in spite of repeated formal invitations to do so. It seems most probable to me that eventually we will find the species in most of the counties of Texas, New Mexico, Arizona, Ok-

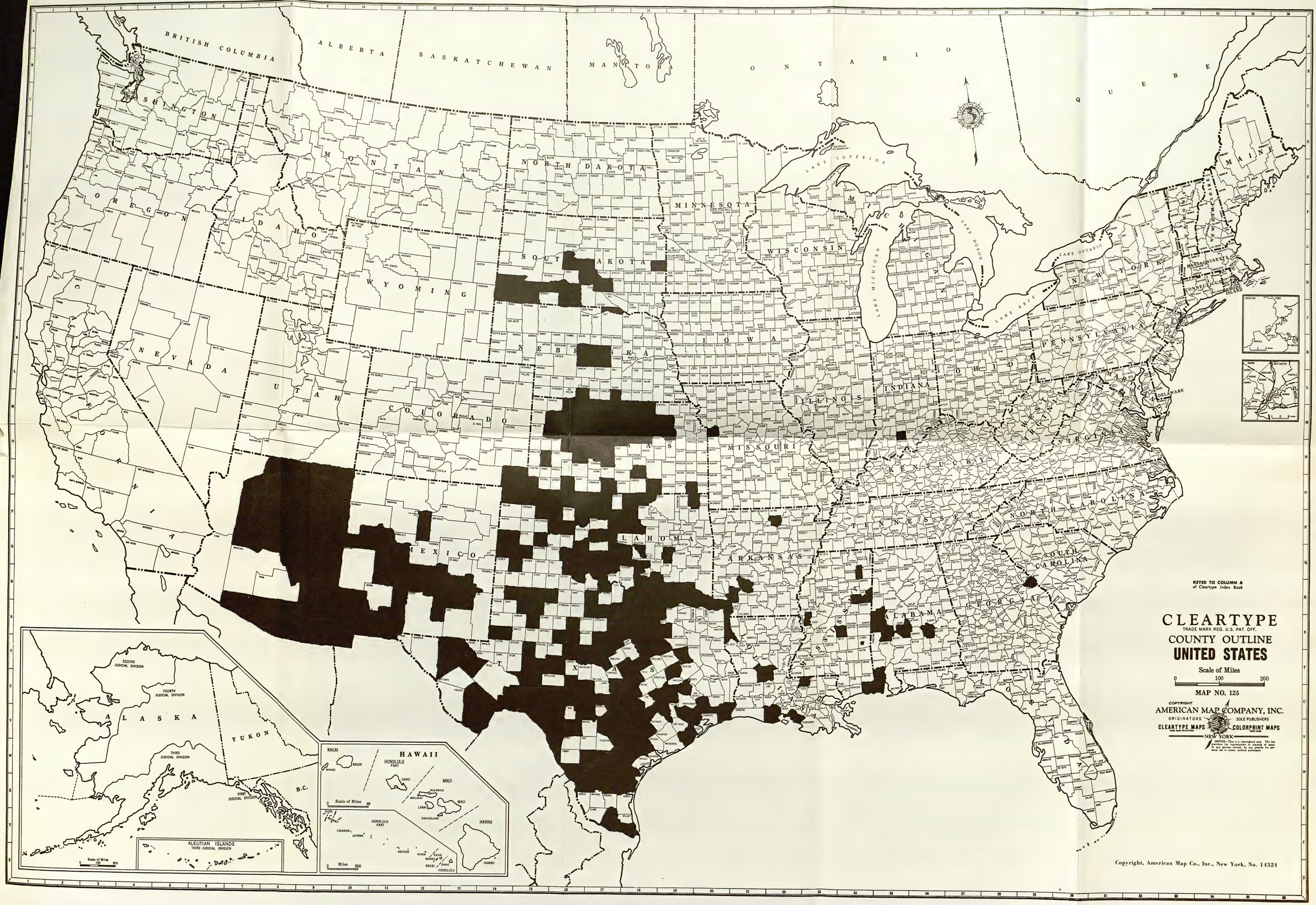
lahoma, Nebraska, and southern South Dakota. It must be remembered that the present map is based only in the specimens examined by me to date.

In regard to the accredition of the binomial, Verbena bipinnatifida, Nuttall's (1821) generic entry is "Verbena, (subgenus Glandularia.) Genus Glandularia, Gmelin", and under this entry he has "— Gl. * bipinnatifida." As Merrill & Reeder (1946) have pointed out, the dash clearly indicates Nuttall's intention to publish this as a Verbena, not as a Glandularia. He did not publish the Glandularia combination until 16 years later (1837). Eaton's "Manual", editions 5 (1829) to 8 (1840), properly credits the binomial to Nuttall, although the "Index Kewensis" credits it to Schauer (1847).

In addition to the specimens cited hereinafter, Perry cites the 161 following specimens not as yet seen by me: ALABAMA: Marengo Co.: E. J. Palmer 27209 (E); Graves 536 (E), 1946 (E). MISSISSIPPI: Jackson Co.: Skehan 47 (G). LOUISIANA: Rapides Par.: Ball 401 (E, G, W). Saint Mary Par.: Langlois s.n. [17.VII.1893] (E, W). MISSOURI: Jackson Co.: B. F. Bush 351 (E, G), 4029 (E, G, W). County undetermined: Geyer s.n. [Upper Missouri, 21 June 1839] (W). ARKANSAS: Hempstead Co.: Eggert s.n. [near Homan, 10 June 1898] (E); E. J. Palmer 8045 (E). Miller Co.: Letterman s.n. [Texarkana, Aug. 1880] (E). County undetermined: Nuttall s.n. [Red River] (G--isotype). SOUTH DAKOTA: Hughes Co.: Nicollet's Northwest Exped. s.n. [Fort Pierre] (W); T. A. Williams s.n. [2 Sept. 1891] (E). Lyman Co.: Over 3177 (W). Fall River Co.: Rydberg 935 (G, W). Mellette Co.: Over 2103 (W); T. A. Williams s.n. [White River, 16 July 1896] (N). Washabaugh Co.: Visher 2132 (F). County undetermined: O. E. White s.n. [near McClure, June 1910] (E). NEBRASKA: Boyd Co.: F. E. Clements 2776 (G, W). Custer Co.: Bates s.n. [Callaway, 4 July 1901] (G). KANSAS: Barber Co.: Smyth 306 (W). Cloud Co.: Carleton s.n. [19 May 1888] (E). Ellis Co.: A. S. Hitchcock 393 (E, G, W); Rydberg & Imler 1253 (E). Morton Co.: Carleton 177 (W); Rose & Fitch 17105 (W). Osborne Co.: Shear 38 (G, W). Riley Co.: A. Nelson 8245 (E, G, W). County undetermined: Parry 157 [Smoky Hill] (E, G). OKLAHOMA: Bryan Co.: C. S. Sheldon 48 (W), s.n. [Caddo, 22 June 1891] (E). Cimarron Co.: Stratton 449 (E). Comanche Co.: M. K. Clemens 11751 (E). Craig Co.: Gurney & Monell s.n. [Vinita, 3 Aug. 1877] (E). Ellis Co.: Clifton 3085 (G). Grant Co.: White 197 (E). Harmon Co.: G. W. Stevens 1108 (G); Stratton 317 (E). Johnston Co.: Griffith 3456 (G). Murray Co.: Emig 395 (E), 788 (E); G. W. Stevens 14 (E, G, W); Stratton 10 (E). Texas Co.: G. W. Stevens 427 (G). Woods Co.: G. W. Stevens 699 (E, G, W), 2850 (G); White 165 (E). TEXAS: Austin Co.: Lindheimer 146 (E). Bell Co.: Ward s.n. [Killeen, 1 Oct. 1891] (W). Bexar Co.: Ball 909 (W).

Figure 3. Distribution of Verbena bipinnatifida in the United States

Mapping by county done by Andrew R. Moldenke



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NOTES ON BROMELIACEAE, XVIII

Lyman B. Smith

TROPICAL AMERICA

GRAVISIA

A study of fresh material has shown that Gravisia in northeastern Brazil consists of more taxa than were previously recognized, and that detailed field observations may reveal still others. Our present admittedly incomplete knowledge may be summarized as follows:

1. Flowers on elongate axes, forming narrow spikes.
   2. Floral bracts minute, not covering the geniculate rhachis.
      1. G. constantinii
   2. Floral bracts 15 mm. long, imbricate and concealing the rhachis.....2. G. lanjouwii
1. Flowers on short axes, forming stout spikes or fascicles.
   3. Spines of the floral bracts much longer than the body of the bract.....3. G. brassicoides
   3. Spines of the floral bracts much shorter than the body of the bract.
      4. Lower branches of the inflorescence equaling to much exceeding the primary bracts.
         5. Floral and secondary bracts firm, even or nearly so, yellow, 2 cm. long; sepal-wing distended basally.
            4. G. fosteriana
         5. Floral and secondary bracts subchartaceous, nerved, roseate, 3 cm. long; sepal-wing cuneate basally.
            5. G. rubens
      4. Lower branches of the inflorescence only about half as long as the primary bracts.
         6. Floral and secondary bracts green.
            6a. G. aquilega var. aquilega
         6. Floral and secondary bracts bright yellow.
            6b. G. aquilega var. chrysocoma

1. GRAVISIA CONSTANTINII Mez, Repert. Sp. Nov. Fedde 14:245. 1916.
   BRAZIL: Indefinite, from cultivation.

2. GRAVISIA LANJOUWII L. B. Smith, Act. Bot. Neerlandica 5:93, fig. 3. 1956.
   SURINAME.

3. GRAVISIA BRASSICOIDES (Baker) Mez in DC. Monogr. Phan. 9:173. 1896.

Aechmea brassicoides Baker, Journ. Bot. 20:329. 1882.
BRITISH GUIANA.

4. GRAVISIA FOSTERIANA L. B. Smith, sp. nov.

A G. aquilega (Salisb.) Mez, cui affinis, bracteis primariis infimis quam ramis brevioribus vel eos aequantibus, bracteis secundariis florigerisque laevibus aureis, floribus haud fasciculatis differt.

Flowering plant over 1 meter high; leaves over 8 dm. long, bearing appressed white scales with brown centers; sheaths broadly subelliptic, ca. 2 dm. long, brown; blades ligulate, broadly acute and cuspidate, to 9 cm. wide, subdensely serrate with dark spines 3 mm. long, faintly banded (! Foster); scape to 1 cm. in diameter, red (! Foster), white-flocculose, soon glabrous; scape-bracts imbricate, large, elliptic, entire, subcoriaceous when dry, densely pale-lepidote; inflorescence tripinnate, to 35 cm. long, lax except near the apex; axes rather slender, soon glabrous; primary bracts like the scape-bracts but much smaller, typically much shorter than the lower branches but equaling them in small specimens; branches spreading, the lowest typically enlarged to 15 cm. long and with the spikes somewhat separated; floral axes short but distinct; flowers in broad digitately clustered spikes; floral bracts broadly ovate, mucronate, 20 mm. long, exceeding the ovary, entire, broadly convex, carinate toward apex, even or nearly so, glabrous, yellow; sepals asymmetric with a broad wing that is distended and auriculate at base, 15 mm. long including the short mucro, short-connate; petals appendaged; ovary glabrous, the epigynous tube 3 mm. high. Pl. I, fig. 1: Basal branch of inflorescence x 1/2; fig. 2: Sepal x 1.

Type in the Gray Herbarium, collected on ground in low moist places, 1/4 mile from ocean, Portoa, State of Bahia, Brazil, June 10, 1939, by M. B. and R. Foster (No. 84).

BRAZIL: Bahia: Dunes, Boca do Rio, near Salvador, May 4, 1952, L. B. Smith, Seabra & Leal Costa 7114 (US). In sand in thickets of Cocoloba, on coast 10 miles north of Salvador, May 29, 1939, M. B. & R. Foster 45 (GH, small specimen with short inflorescence). Agua Preta, 1939, M. B. & R. Foster 60 (US, flowered in cultivation, inflorescence small, axes flocculose at anthesis).

5. GRAVISIA RUBENS L. B. Smith, sp. nov.

A G. aquilega (Salisb.) Mez, cui affinis, bracteis primariis infimis quam ramis brevioribus, bracteis secundariis florigerisque subchartaceis rubentibus, floribus haud fasciculatis differt.

Flowering plant over 6 dm. high; leaves (only one known) ca. 55 cm. long, bearing appressed white scales with brown centers; sheaths broadly subelliptic, scarcely distinct from the blades, ca. 2 dm. long, dark brown; blades ligulate, broadly rounded and cuspidate, to 12 cm. wide, subdensely serrate with dark spines 3 mm. long; scape over 7 mm. in diameter, soon glabrous; scape-bracts imbricate, large, elliptic, entire, subcoriaceous when dry, densely pale-lepidote; inflorescence tripinnate, 35 cm. long, lax; axes soon glabrous; primary bracts like the scape-

bracts, shorter than the branches, deep rose; branches spreading-ascending, to 14 cm. long, the lowest with the spikes somewhat separated; spikes broadly fusiform; floral bracts broadly ovate, mucronulate, 30 mm. long, subchartaceous, strongly nerved, broadly convex, slightly carinate toward apex, glabrous, the outer ones deep rose with narrow yellow margin, the inner progressively paler; sepals asymmetric with a large semi-elliptic wing that is cuneate at base, 22 mm. long including the short mucro, short-connate; petals appendaged; pollen grains globose, multiporate; ovary glabrous, the epigynous tube 2.5 mm. high. Pl. I, fig. 3: Basal branch of inflorescence x 1/2; fig. 4: Sepal x 1.

Type in the U. S. National Herbarium, from cultivation in the Jardin Botanique de Montréal (No. 2284-57). Supposedly this came from Mulford Foster's Brazilian collections, but so far I can find nothing in his herbarium vouchers that resembles it.

6. GRAVISIA AQUILEGA (Salisb.) Mez in DC. Monogr. Phan. 9:173. 1896.

6a. GRAVISIA AQUILEGA var. AQUILEGA

Bromelia aquilega Salisb. Parad. Lond. pl. 40. 1806.

COSTA RICA, VENEZUELA, TRINIDAD, TOBAGO, GUIANA, BRAZIL.

6b. GRAVISIA AQUILEGA var. CHRYSOCOMA (Baker) L. B. Smith, comb. nov.

Aechmea chrysocoma Baker, Handb. Bromel. 44. 1889.

Hohenbergia chrysocoma E. Morr. ex Baker, Handb. Bromel. 44. 1889, nomen in synon.

Gravisia chrysocoma (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 301, pl. 65. 1892.

In living material, the bright yellow secondary and floral bracts of var. chrysocoma are strikingly different from the dull green ones of typical Gravisia aquilega, but the distinction is lost in most herbarium specimens.

BRAZIL: Cultivated, Devansaye (LG, type or type strain). PERNAMBUCO: Afogados to Boa Viagem, Baker & Collins (GH). Caxagua, Ridley, Lea & Ramage (BM). BAHIA: Jacobina, Foster 91 (GH).

TILLANDSIA SETACEA Sw. Fl. Ind. Occ. 1:593. 1797.

Renealmia recurvata β. L. Sp. Pl. 287. 1753.

Tillandsia tenuifolia sensu auctt. plur., non L. 1753.

Linnaeus' original publication of Tillandsia tenuifolia in the first edition of the "Species Plantarum" (p. 286) was based on two references, Van Royen and Plumier. In the second edition in 1762 (p. 440), he omitted the Plumier reference and by retaining the Van Royen automatically made it the type. That he added other references is beside the point. Thanks to the kindness of Dr. Lam, I have received from the Rijksherbarium, Leiden, a photograph of Van Royen's specimen. This proves to be the same as Tillandsia pulchella Hooker and curiously enough already has been so annotated by Mez. Thus the nomenclature of that species must be revised as follows:

TILLANDSIA TENUIFOLIA L. Sp. Pl. 286. 1753.

TILLANDSIA TENUIFOLIA var. TENUIFOLIA
Tillandsia foliis lineari-subulatis integerrimis imbricatis, caule oblongo, spica simplici laxa Van Royen, Prodr. Lugdb. 25. 1740.
Tillandsia pulchella Hook. Exot. Fl. 2:pl. 154. 1825.

TILLANDSIA TENUIFOLIA var. DISTICHA (L. B. Smith) L. B. Smith, comb. nov.
Tillandsia pulchella var. disticha L. B. Smith, Arquiv. Bot. Estado Sao Paulo nov. ser. 1:114, pl. 117. 1943.

TILLANDSIA TENUIFOLIA var. SAXICOLA (L. B. Smith) L. B. Smith, comb. nov.
Tillandsia pulchella var. saxicola L. B. Smith, Arquiv. Bot. Estado São Paulo nov. ser. 1:115, pl. 118. 1943.

TILLANDSIA TENUIFOLIA var. SURINAMENSIS (Mez) L. B. Smith, comb. nov.
Tillandsia pulchella var. surinamensis Mez in Mart. Fl. Bras. 3, pt. 3:603. 1894.

TILLANDSIA TENUIFOLIA var. VAGINATA (Wawra) L. B. Smith, comb. nov.
Tillandsia pulchra var. vaginata Wawra, Oesterr. Bot. Zeitschr. 30:224. 1880.

MEXICO

PITCAIRNIA MATUDAE L. B. Smith, sp. nov.
Pitcairnia densiflora sensu Matuda, Bromel. Chiapas in Anal. Inst. Biol. México 23, No. 1, 2:96. 1952, as to specimen.
A P. densiflora Brongn., cui affinis, foliorum petiolis serrulatis, scapi bracteis haud foliaceo-laminatis, bracteis florigeris apice patentibus vel reflexis differt.
Flowering shoot erect, 35 cm. high; leaves over 1 m. long, much exceeding the inflorescence; sheaths broadly ovate, 3 cm. long, entire, dark castaneous, densely brown-lepidote; petioles distinct, narrow, involute, obscurely serrulate; blades linear-lanceolate, acuminate at both ends, to 5 cm. wide, entire, soon glabrous, narrowly channeled toward base; scape ca. 8 mm. in diameter, brown-flocculose at first; scape-bracts erect, densely imbricate, elliptic, apiculate, not at all foliaceous, the highest membranaceous, red; inflorescence densely subcylindric, obtuse, 13 cm. long, the axis brown-flocculose; floral bracts imbricate but spreading to reflexed near apex, elliptic, acute, 45 mm. long, much exceeding the sepals, entire, membranaceous; pedicels short but slender; sepals oblong, acute, 30 mm. long, thin, the lateral ones carinate; petals over 6 cm. long, appendaged; ovary 2/3 superior; ovules caudate. Pl. I, fig. 5: Inflorescence x 1/2; fig. 6: Sepal x 1.

Type in the Gray Herbarium of Harvard University, collected on Monte Ovando, State of Chiapas, Mexico, April 9-12, 1937, by E. Matuda (No. 1854).

TILLANDSIA DRESSLERI L. B. Smith, sp. nov.

T. disticha H.B.K. in systema Mezii proxima sed bulbo elongato, foliorum laminis majoribus reflexis, sepalis subaequaliter liberis differt. A T. balbisiana Schult. cujus habitu valde imitans, staminibus quam petalis brevioribus (Subgen. Allardtia) differt.

Stemless, flowering 35 cm. high; leaves bulbous-rosulate, covered with minute subappressed cinereous scales; sheaths ovate, to 10 cm. long, tightly clasping the scape and forming a narrowly ovoid bulb; blades strongly reflexed, very narrowly triangular, filiform-acuminate, to 55 cm. long, 15 mm. wide, involute toward apex; scape erect, soon glabrous, sulcate when dry; scape-bracts densely imbricate and concealing the scape, subfoliaceous with small elliptic sheaths and elongate reflexed blades, very densely lepidote; inflorescence bipinnate, 12 cm. long, subdigitate; primary bracts incompletely known but their sheaths shorter than the spikes, very densely lepidote; spikes divergent, oblong-lanceolate, 3-8 cm. long, 15 mm. wide, to 16-flowered, strongly complanate; rhachis flexuous, winged, sparsely and obscurely punctulate-lepidote; floral bracts densely imbricate but narrow and more or less exposing the rhachis, ovate, acute, to 18 mm. long, much exceeding the sepals, sharply carinate, subcoriaceous, glabrous, lustrous; flowers subsessile; sepals equally subfree, oblong-lanceolate, broadly acute, 12 mm. long, glabrous, nerved; petals blue-purple (! Dressler), the blades divergent, nearly 2 cm. long, exceeding the stamens. Pl. I, fig. 7: Inflorescence x 1/2.

Type in the herbarium of the Missouri Botanical Garden, collected on trees, 8 miles south of Agua Nueva, State of Sinaloa, Mexico, December 31, 1949, by Robert L. Dressler.

COSTA RICA

VRIESEA APICULATA L. B. Smith, sp. nov.

A V. subsecunda Wittm., cui verisimiliter affinis, foliis rotundatis longe apiculatisque, floribus per anthesin vix secundis, sepalis extus dense punctulato-lepidotis differt.

Flowering shoot 23 cm. high, leaves about 15 in a subspreading rosette, to 25 cm. long, the lower half covered on both sides with appressed white scales; sheaths ovate, ca. 5 cm. long; blades narrowly ligulate, rounded and long-apiculate, 13 mm. wide, flat; scape erect; scape-bracts densely imbricate and wholly covering the scape, the lower subfoliaceous but much reduced, the upper elliptic, apiculate, very pale green; inflorescence sublaxly 3-flowered; axis slender, punctate; floral bracts divergent and exposing much of the axis, broadly ovate, acute, 26 mm. long, exceeding the sepals, ecarinate, subcoriaceous, very pale green, punctulate-lepidote; flowers subsessile, not secund at an-

thesis; sepals broadly ovate, obtuse, 23 mm. long, 15 mm. wide, ecarinate, punctulate-lepidote on the outside; petals white, bearing 2 lanceolate scales at base, the blades 5-6 mm. long; stamens included. Pl. II, fig. 1: Apex of leaf x 1/2; fig. 2: Inflorescence x 1/2; fig. 3: Sepal x 1.

✓Type in the U. S. National Herbarium, collected in Costa Rica, by Robert G. and Catherine Wilson (No. 31), and flowered in cultivation.

VRIESEA HELICONIOIDES (H.B.K.) Hook. ex Walp. var. POLYSTICHA L. B. Smith, var. nov.

A var. heliconioides floribus plus quam distiche ordinatis differt.

Differing from the typical variety in having the flowers in more than 2 ranks.

✓Type in the U. S. National Herbarium, collected in Costa Rica, in 1960, by Robert G. and Catherine Wilson (No. 29), and flowered in cultivation.

VRIESEA HYGROMETRICA (André) L. B. Smith & Pittendrigh var. ANGUSTIFOLIA L. B. Smith, var. nov.

A var. hygrometrica foliorum laminis angustioribus differt.

Leaf-blades only 25 mm. wide.

✓Type in the U. S. National Herbarium, collected in Costa Rica, by Robert G. and Catherine Wilson (No. 32) and flowered in cultivation.

WEST INDIES

PITCAIRNIA

The West Indian species of Pitcairnia are all endemic to that area with the single exception of P. integrifolia Ker-Gawl. which barely extends outside onto the Paria Peninsula of Venezuela, just across from Trinidad. Within the area there is still further endemism, Cuba having one endemic species, Jamaica two, and Hispaniola four. Porto Rico has a single species shared with the Virgin Islands and possibly elsewhere. The remaining species are scattered through the Lesser Antilles, except the already noted P. integrifolia which is just in Trinidad and the adjacent mainland.

In spite of their geographic separation, the West Indian species of Pitcairnia show few consistent characters to enable one to distinguish them taxonomically from the remainder of the genus. The petals are appendaged, but with partial exception in P. integrifolia. The seeds are narrow with a very narrow lateral section of the wing and usually a broad flat apical section. This last character is fairly distinctive but is not typical of P. albucifolia. The group is revised as follows:

1. Racemes dense especially toward apex; inflorescence simple. Lesser Antilles.

2. Floral bracts broadly ovate.....1. P. spicata
2. Floral bracts lanceolate.....2. P. albucifolia
1. Racemes lax throughout.
3. Pedicels 15-30 mm. long, stiffly spreading. Jamaica.
4. Leaf-blades 15 mm. wide.....3. P. bromelilifolia
4. Leaf-blades to 32 mm. wide.....4. P. platyphylla
3. Pedicels not over 12 mm. long, or when rarely longer, then curved and secund. Non-Jamaican West Indies.
5. Leaves evenly spinose-serrate throughout, not more than 20 mm. wide.
6. Leaf-blades 10-20 mm. wide; flowering plant 1-2 m. high. Porto Rico, Lesser Antilles.....5. P. angustifolia
6. Leaf-blades 4 mm. wide; flowering plant 55 cm. high. Dominican Republic.....6. P. elizabethae
5. Leaves (or the larger ones when dimorphic) largely entire or if evenly spinose, then much more than 20 mm. wide (P. gracilis, P. latifolia form).
7. The leaves of the fertile rosette dimorphic and the inflorescence simple or few-branched; leaf-blades to 18 mm. wide.
8. Sepals 14-16 mm. long. Cuba.....12. P. cubensis
8. Sepals 17-25 mm. long. Hispaniola.
9. Petals red; sepals acute.....7. P. fuertesii
9. Petals yellow or cream; sepals obtuse..8. P. samuelssonii
7. Leaves of the fertile rosette all alike or the inflorescence much branched.
10. Sepals to 25 mm. long; leaf-blades mostly more than 20 mm. wide. Lesser Antilles.
11. Flowers erect or suberect; leaves all alike; inflorescence simple or few-branched.....9. P. latifolia
11. Flowers spreading or nutant, often secund; leaves dimorphic; inflorescence much branched.....10. P. gracilis
10. Sepals 14-20 mm. long; leaf-blades 10-19 mm. wide.
12. Inflorescence much branched. Trinidad.
11. P. integrifolia
12. Inflorescence simple or few-branched.
13. Sepals 14-16 mm. long; inflorescence mostly simple. Cuba.....12. P. cubensis
13. Sepals 20 mm. long; inflorescence mostly branched. Dominican Republic.....13. P. jimenezii

1. PITCAIRNIA SPICATA (Lam.) Mez in DC. Monogr. Phan. 9:396. 1896.

1a. PITCAIRNIA SPICATA var. SPICATA
Bromelia spicata Lam. Encycl. 1:146. 1783.
Petals red.
Lesser Antilles: St. Kitts, Guadeloupe, Dominica, Martinique.

1b. PITCAIRNIA SPICATA var. SULPHUREA (Andr.) Mez in DC. Monogr. Phan. 9:393. 1896.
Pitcairnia sulphurea Andr. Bot. Repos. 4: pl. 249. 1802.

Petals yellow.
Lesser Antilles: Dominica, St. Vincent.

2. PITCAIRNIA ALBUCIFOLIA Schrad. Blumenb. 24. 1827.
Lesser Antilles: Martinique, St. Vincent.

3. PITCAIRNIA BROMELIIFOLIA L'Hérit. Sert. Angl. 7, pl. 11. 1789 (fide International Code Bot. Nomencl. 225. 1956); Ait. Hort. Kew. 1:401. 1789; Sw. Fl. Ind. Occ. 1:580. 1797.
Hepetis angustifolia Sw. Prodr. 56. 1788, non Pitcairnia angustifolia Ait. 1789.
In both of his monographs, Mez identifies Hepetis angustifolia Sw. with the species of Porto Rico, in spite of the fact that Swartz cited "Jamaica" in his original description and later reduced his own species to Pitcairnia bromeliifolia. Records other than Jamaica would appear to be misidentifications.

4. PITCAIRNIA PLATYPHYLLA Schrad. Blumenb. 26. 1827.
Jamaica.
With no other distinction than a broader leaf it is doubtful if this merits separation from Pitcairnia bromeliifolia, but it would be well to examine recent material before reducing it.

5. PITCAIRNIA ANGUSTIFOLIA Ait. Hort. Kew. 1:401. 1789.
Pitcairnia ramosa Jacq. f. Eclog. Pl. 1:154, pl. 79. 1816.
Pitcairnia tomentosa Dietr. Lex. Nachtr. 6:305. 1820, in synon; Dietr. ex Beer, Bromel. 64. 1857.
Pitcairnia angustifolia "(Sw.) Redouté" ex Mez in DC. Monogr. Phan. 9:405. 1896.
Porto Rico, Virgin Islands, and doubtfully elsewhere in the Lesser Antilles.
In using Pitcairnia angustifolia as a new combination, Mez erred both in the application of the basionym, Hepetis angustifolia Sw., and in the use of a later homonym of Pitcairnia angustifolia of Aiton.

6. PITCAIRNIA ELIZABETHAE L. B. Smith, Bromel. Soc. Bull. 8:20, figs. 1958.
Dominican Republic: Barahona.

7. PITCAIRNIA FUERTESII Mez, Fedde Rep. Spec. Nov. 12:415. 1913.
Pitcairnia tomentosa sensu Mez in DC. Monogr. Phan. 9:389. 1896, non Dietr. ex Beer 1857.
Pitcairnia fulgens sensu Mez in Urban, Symb. Ant. 8:87. 1920, non Dcne. ex Dietr. 1851.
Dominican Republic, Haiti (?).
Urban cited Taylor 109 from the vicinity of San Lorenzo on Samaná Bay as the basis for reporting Pitcairnia fulgens Dcne. from the Dominican Republic. Pitcairnia fulgens Dcne. is probably a synonym of the Brazilian P. flammea Lindl., and Taylor 109 in the New York Botanical Garden is P. fuertesii Mez.

Plate I

Fig. 1, 2: Gravisia fosteriana; fig. 3, 4: Gravisia rubens;
fig. 5, 6: Pitcairnia matudae;
fig. 7: Tillandsia dressleri.

8. PITCAIRNIA SAMUELSSONII L. B. Smith, Contrib. Gray Herb. 117: 28, pl. 2, figs. 24-26. 1937.
Pitcairnia xanthocalyx sensu Mez in Urban, Symb. Ant. 8:87. 1920, non Mart. 1848.
Dominican Republic, Haiti.

9. PITCAIRNIA LATIFOLIA Ait. Hort. Kew. 1:401. 1789.
Lesser Antilles: Montserrat, Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenadines, Grenada.
It has not been possible to confirm records of this species from Porto Rico and Dominican Republic and it is suspected that they are based on misidentifications, probably of P. fuertesii in the case of the Dominican Republic.

10. PITCAIRNIA GRACILIS Mez in DC. Monogr. Phan. 9:407. 1896.
Lesser Antilles: Montserrat, Guadeloupe, Dominica, St. Lucia, St. Vincent, Grenada.

11. PITCAIRNIA INTEGRIFOLIA Ker-Gawl. Bot. Mag. 36: pl. 1462. 1812.
Trinidad; Paria Peninsula, Venezuela.

12. PITCAIRNIA CUBENSIS (Mez) L. B. Smith, Contrib. Gray Herb. 117:24, pl. 2, figs. 12, 13. 1937.
Pitcairnia latifolia var. cubensis Mez in DC. Monogr. Phan. 9: 396. 1896.
Cuba: Oriente.

13. PITCAIRNIA JIMENEZII L. B. Smith, Phytologia 7:1, pl. 1, figs. 3-5. 1959.
Dominican Republic: Puerto Plata.

PERU

GREIGIA AMAZONICA L. B. Smith, sp. nov.
G. danielii L. B. Smith in systema mea (Contrib. U. S. Nat. Herb. 29:286-292) proxima sed bracteis exterioribus dense lepidotis, sepalis majoribus basi solum castaneis differt.
Caudex erect, ca. 15 cm. long; leaves numerous, ca. 65 cm. long; sheaths elliptic, 10 cm. long, entire, dark castaneous, covered with whitish transparent appressed scales; blades linear, acuminate, 15 mm. wide, densely but inconspicuously appressed-lepidote above, sparsely so beneath, at base subdensely serrate with dark straight or curved spines 5 mm. long, involute when dry; inflorescence single (?), few-flowered; the outer bracts broadly ovate, acute or the lowest laminate, exceeding the sepals, entire, covered with conspicuous white appressed scales; floral bracts broadly elliptic, acute, mucronate, shorter than the sepals, densely pale-lepidote; sepals free, slightly asymmetrical, subtriangular, acuminate, mucronate, 25 mm. long, alate-carinate, green except the castaneous base, glabrous or nearly so; petals 35 mm. long, naked; pollen grains spherical, smooth.

Pl. II, fig. 4: Inflorescence x 1/2; fig. 5: Sepal x 1.
Type in the U. S. National Herbarium, No. 2,340,435, collected in Amazonian lowland, Peru, 1960, by Lee Moore (No. A-120).

NEOREGELIA ELEUTHEROPETALA (Ule) L. B. Smith var. BICOLOR L. B. Smith, var. nov.

A var. eleutheropetala foliorum laminis subtus dense adpresseque albido-lepidotis differt.

Leaf-blades strongly bicolorous because of the dense minute whitish scales on the under surface.

Type in the U. S. National Herbarium, Nos. 2,343,779 and 2,343,780, collected in the vicinity of Loreto, Peru, by Lee Moore.

NEOREGELIA MOOREANA L. B. Smith, sp. nov.

A N. myrmecophila (Ule) L. B. Smith, cui affinis, laminis foliorum valde recurvatis, inflorescentia simplicissima, sepalis connatis lepidotis differt.

Plant propagating vegetatively by stolons 8 mm. in diameter; leaves about 20 in a dense rosette, 3 dm. long; sheaths elliptic, about as long as the blades, subdensely lepidote with brown-centered scales; blades recurving, linear, caudate-attenuate, 15 mm. wide, laxly serrate with dark antrorse spines 2 mm. long, sparsely pale-lepidote above, glabrous beneath; inflorescence sunk in the center of the rosette, simple, few-flowered; floral bracts elliptic, 3 cm. long, about equaling the sepals, cucullate, sparsely lepidote, very minutely serrate with soft spines; pedicels short and obscure; sepals elliptic, cucullate, 13 mm. long, connate for 4 mm., sparsely lepidote; petals 30 mm. long, white, the blades narrowly elliptic; ovary slenderly cylindric, about 12 mm. long; placentae apical; ovules short-caudate; epigynous tube conical, short. Pl. II, fig. 6: Leaf apex x 1/2; fig. 7: Floral bract and flower x 1; fig. 8: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,338,767, collected in small trees, upper reaches of the Napo River near Iquitos, Department of Loreto, Peru, in 1960, by Lee Moore.

This is the same species that Mr. Moore has distributed under the name, Neoregelia ossifragi. Since the earlier name was never validly published, I am following his request not to use it.

PUYA VARGASIANA L. B. Smith, sp. nov.

A P. bicolor Mez atque P. araneosa L. B. Smith, quibus affinis, bracteis florigeris maximis sepala superantibus, sepalis lineari-lanceolatis acuminatis differt.

Known only from fragments but certainly over 1 m. high; leaves ca. 5 dm. long; blades narrowly triangular, brown-lanate beneath, soon glabrous above, laxly serrate with slender curved antrorse spines 5 mm. long; scape over 1 cm. in diameter, finely brown-lanate; scape-bracts erect, imbricate but exposing much of the scape, narrowly ovate with long linear subentire blades, subdensely pectinate-serrate, red, finely brown-lanate, becoming glabrous with age; inflorescence laxly bipinnate, finely brown-

lanate except the petals; primary bracts lanceolate, acuminate, to 8 cm. long, at least half as long as the axillary branches, chartaceous, red, the lower ones sparsely serrate; racemes with a long sterile naked base, arched-spreading, laxly few-flowered; floral bracts more or less secund with the flowers, lanceolate, acuminate, to 5 cm. long, exceeding the sepals, entire, thin; pedicels inconspicuous, obconic, 5 mm. long; sepals narrowly lance-triangular, filiform-acuminate, 43 mm. long; petals (immature) naked. Pl. II, fig. 9: Branch of inflorescence x 1/2; fig. 10: Sepal x 1.

Type in the Gray Herbarium of Harvard University, collected at Amaibamba, Santa Bárbara, Province of Convención, Department of Cuzco, Peru, December 30, 1948, by C. Vargas (No. 7558).

BRAZIL

PITCAIRNIA EGLERI L. B. Smith, sp. nov.

A P. torresiana L. B. Smith, cui affinis, foliorum laminis persistentibus basi serratis differt.

Stemless, flowering 35 cm. high but the leaves exceeding the inflorescence; leaves dimorphic, all persistent, to 60 cm. long; sheaths of the outer leaves broadly ovate, small, dark castaneous, pale-lepidote toward the apex, very narrowly laminate, those of the inner leaves elongate; blades of the inner leaves linear, filiform-acuminate, to 9 mm. wide, serrulate and sparsely lepidote toward base, elsewhere entire and glabrous; scape erect, very slender, soon glabrous; inflorescence simple, laxly racemose, 9-11 cm. long, rather few-flowered; floral bracts spreading, lanceolate, to 8 mm. long; pedicels ascending, slender, 15 mm. long, much exceeding the bracts; flowers red; sepals oblong, broadly rounded at apex, 13 mm. long, ecarinate; petals 4 cm. long, bearing a scale at base; ovary slightly more than 1/2 superior; ovules caudate. Pl. II, fig. 11: Base of plant x 1/2; fig. 12: Inflorescence x 1/2; fig. 13: Flower x 1; fig. 14: Sepal x 1.

Type in the U. S. National Herbarium, No. 2,324,964, collected on wet sandstone cliff, Creputiá, Rio Cururú, region of the Alto Tapajós, State of Pará, Brazil, February 3, 1960, by W. A. Egler (No. 1246) and Raimundo. Isotype in the Museu Paraense "Emilio Goeldi."

This new species is dedicated as a sorrowful tribute to my friend and colleague, the late Dr. Walter Alberto Egler, who lost his life on August 28, 1961, while exploring the Rio Jari.

ARGENTINA

PITCAIRNIA ORANENSIS L. B. Smith, sp. nov.

A P. chiriguana Castellanos, cui affinis, scapi bracteis remotis, sepalis oblongo-lanceolatis majoribus differt.

Flowering 1 m. high; leaves dimorphic, some reduced to large ovate dark castaneous ferruginous-lepidote sheaths, others normally functional with slender serrulate petioles; blades persistent, linear-lanceolate, long-acuminate at both ends, over 8 dm.

Plate II

Fig. 1-3: Vriesea apiculata; fig. 4, 5: Greigia amazonica; fig. 6-8: Neoregelia mooreana; fig. 9, 10: Puya vargasiana; fig. 11-14: Pitcairnia egleri; fig. 15-17: Pitcairnia oranensis.

long, 24 mm. wide, entire, channeled toward base, covered beneath with white appressed scales, glabrous above; scape erect, 8 mm. in diameter, soon glabrous; scape-bracts lance-triangular, entire, all but the lowest remote; inflorescence (only one known) bipinnate with a single lateral branch, over 3 dm. long, appressed-stellate but soon glabrous; primary bract broadly ovate, apiculate, 6 mm. long; racemes elongate, laxly flowered with long sterile laxly bracteate bases; floral bracts broadly ovate, 5 mm. long; pedicels ascending at anthesis, 15 mm. long, sepals oblong-lanceolate, obtuse, 27 mm. long, ecarinate; petals obtuse, naked; ovary 4 mm. inferior. Pl. II, fig. 15: Lateral branch of inflorescence x 1/2; fig. 16: Flower x 1; fig. 17: Sepal x 1.

Type in the Gray Herbarium of Harvard University , collected in semi-shade on sandy limestone cliff, quebrada (ravine) in Cerros de Rio Ytau, 65 km. west of Manuel Pedraza, 12 km. west of San Pedrico, Department of Oran, Province of Salta, Argentina, 800 meters altitude, October 31, 1938, by W. J. Eyerdam and A. A. Beetle (No. 22795 in Goodspeed Expedition).

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. IV

Harold N. Moldenke

VERBENA BIPINNATIFIDA Nutt.

A continuation follows of the listing of specimens cited by Miss Perry, but not as yet examined by me: TEXAS: Bexar Co.: Berlandier 429=?1749 (G), 1449=189 (G); Eggert s.n. [San Antonio, 4 April 1901] (G); Groth 30 (F, G, W); Moore & Steyermark 3001 (E); Von Schrenk s.n. [vicinity of San Antonio, April 1919] (G); Wilkinson 9 (E). Brazoria Co.: Bush 205 (E, W). Comal Co.: Lindheimer 1072 (E, F, G, W), 1073 (E, F, G, W). Dallas Co.: Eggert s.n. [Dallas, 22 June 1899] (E), s.n. [near Garland, 24 June 1899] (E); Reverchon 739 (E, W), 1962 (E, F, G, W), s.n. [Dallas] (G, W). De Witt Co.: Howell 308 (W). Edwards Co.: M. E. Jones 26228 (E). Gillespie Co.: G. Jermy 183 (E). Goliad Co.: Berlandier 2428-998 (E, G). Hays Co.: Trelease s.n. [San Marcos, 11 June 1897] (E). Hemphill Co.: Eggert s.n. [Canadian, 10 Aug. 1900] (E); Howell 111 (W). Hood Co.: Eggert s.n. [near Granbury, 4 May 1900] (E); E. J. Palmer 6510 (E). Kaufman Co.: Tyler s.n. [vicinity of Terrell, 4 May 1904] (W). Kinney Co.: Mearns 1252 (W), 1274 (W), 1394 (W). Navarro Co.: E. J. Palmer 7821 (E). Parker Co.: S. M. Tracy 7999 (E, F, G, W). Tarrant Co.: Ruth 107 (E, F, G, W). Taylor Co.: Eggert s.n. [near Abilene, 7 June 1900] (E); S. M. Tracy 8000 (E, F). Travis Co.: E. J. Palmer 33389 (E, G). Victoria Co.: Eggert s.n. [near Victoria, 10 April 1900] (E); Maxon 3808 (W); E. J.

Palmer 9098 (E). Walker Co.: Dixon 561 (F). County undetermined: Lindheimer 232 (E), 289 (E, F, G, W), 307 (G). NEW MEXICO: Chaves Co.: Earle & Earle 526 (E). Santa Fe Co.: Earle 84 (E). County undetermined: W. Wright 1502 (G, W), 1504, in part (D). ARIZONA: Cochise Co.: Blumer 1345 (E, F, G); Goodding 251 (G), 495 (G); Goodman & Hitchcock 1211 (E). Coconino Co.: D. T. MacDougal 317 (D, F, G). Pima Co.: Pringle s.n. [April 13, 1881] (G). Santa Cruz Co.: Peebles, Harrison, & Kearney 4549 (W). MEXICO: Chihuahua: Nelson 6117 (G, W); Townsend & Barber 139 (E, F, G, W). It should be noted that the New York specimen of Visher 2132, which she cites here, is regarded by me as V. ambrosifolia Rydb., and those of Bush 4029, Blumer 1345, Earle & Earle 526, Goodding 251, and G. W. Stevens 14 are regarded by me as V. bipinnatifida var. latilobata Perry. She cites Hayden s.n. (E) from Montana with a question -- the label merely says "sandy soil along Yellowstone and Upper Missouri". She cites M. E. Jones 26228 and 26229 as "in part", the former as a mixture with V. pumila Rydb. and the latter with V. halei Small. She cites Berlandier 1449=189 in the Gray Herbarium as from "San Antonio de Bexar" [Bexar Co.], but I have cited no. 1449 in the Lund herbarium as from Travis Co., Texas.

Miss Perry annotated a specimen of Mearns 159 from Flagstaff, Arizona, collected on June 17, 1887, in the Columbia University Herbarium at the New York Botanical Garden as "V. bipinnatifida Nutt." in 1932, but does not cite it under that species in her monograph; it is probably the Mearns s.n. which she cites there under var. latilobata, and I am also so regarding the collection. She cites an Eggert s.n. from "along railroads, Miller Co. [Arkansas], 19 June 1908" as in the New York herbarium -- actually the date of this collection is "1898", not "1908".

Miss Perry, in her very excellent monograph of the North American species of Verbena, notes that "In the specimens from Arizona and Mexico.....the pubescence is hispidulous and the spikes at maturity are, for the most part, dense rather than elongated. The typical form of the species is very easily recognized by the hispid-hirsute pubescence, particularly of the inflorescence, the lack of glands, the long floral bracts, the elongating spike, the deeply cut leaves, and a rather coarse habit. Apparently it intergrades with V. ciliata in northern Mexico, with V. ambrosifolia in New Mexico, and at times with V. canadensis in the southwestern part of its range. Nevertheless, in spite of the many intermediate phases, it seems preferable to maintain each group as specific entities."

In all, 1138 herbarium specimens, including the types of most of the names involved, have been examined by me.

Citations: GEORGIA: Richmond Co.: Cuthbert s.n. [Augusta, May 1, 1903] (Fl--21063, Fl—21064). ALABAMA: Dallas Co.: R. M.

Harper 15 (N). Greene Co.: R. M. Harper 3183 (Ba, N); W. H. Rhoades s.n. [Clinton, July 1927] (Hs, N). Montgomery Co.: L. H. Bailey 45 (Ba); L. H. Pammel s.n. [May 30, 1921] (Io--102436); W. H. Rhoades s.n. [H. N. Moldenke 17089;Montgomery, July 1931] (Bt, N, St). Sumter Co.: W. H. Rhoades s.n. [near Gainesville, July 1927] (N). MISSISSIPPI: Lee Co.: R. D. Ray 5858 (N); B. Shelton 79 (St). Lowndes Co.: Diener 930 (Tl). Oktibbeha Co.: Weatherby & Weatherby 6313 (N, Up). Scott Co.: W. H. Rhoades s.n. [Morton, July 1927] (N). Sharkey Co.: J. D. Ray 4923 (N). SOUTH DAKOTA: Brookings Co.: Gunn s.n. [Brookings, 7-10-1895] (Io--15336). Brule Co.: E. N. Wilson s.n. [July 1893] (Ob--50770). Custer Co.: Hayward 2562 (Se--77056). Fall River Co.: Rydberg 935 (C, N). Hughes Co.: T. A. Williams s.n. [Pierre, Sept. 2, 1891] (N), s.n. [Blunt, Aug. 16, 1892] (Pl--22605); Williams & Wilcox s.n. [Pierre, 1891] (Ob--50769). Lyman Co.: Over s.n. [July 14, 1914] (Se--14956). Mellette Co.: Brenckle 51323 (Le); E. J. Wallace s.n. [White River, 7/16/1896] (N). Shannon Co.: Visher 2177 (N). Todd Co.: C. J. Elmore s.n. [Rosebud, Aug. 24, 1914] (Je--3154). County undetermined: J. B. H. s.n. [Bad Lands, June 1886] (Ca--25129). KANSAS: Barber Co.: W. H. Horr 3569 (Lw). Cloud Co.: Carleton s.n. [Warren, July 20, 1883] (Ur), s.n. [Aug. 20, 1884] (Ka), s.n. [June 14, 1886] (Ka, Ur, Ur, Ur); S. V. Fraser 442 (Ka--78951). Decatur Co.: A. S. Hitchcock s.n. [Jennings, June 25, 1892] (Ka). Ellis Co.: Bondy s.n. [June 7, 1935] (Se--54978); G. C. Deane s.n. [June 24, 1882] (Dt); F. C. Gates 16931 (Ka--76208); A. S. Hitchcock 393 (N), s.n. [Plains, July 16, 1895] (Ka); Imler s.n. [May 18, 1928] (Lw); Kellerman 9 (N); Rydberg & Imler 1166, in part (N), 1183 (Ka--75067), 1212 (N), 1253 (Lw, N); Sci. Exped. '85 s.n. [June 26, 1885] (Ka); H. Shepherd 83 (Cm, Dm, En, Ms, Ok, St--9211, Vt). Ellsworth Co.: M. Becker s.n. [Kanopolis, Summer 1896] (Ka); A. S. Hitchcock s.n. [Ellsworth Co., July 1895] (Ka). Geary Co.: F. C. Gates 17500 (Ka--79408). Gove Co.: A. S. Hitchcock s.n. [Gove Co., July 1895] (Ka). Graham Co.: Imler 21 (Ka--74707), 2021 (Bl--42247), s.n. [Bogue, Sept. 12] (Lw). Hodgeman Co.: A. S. Hitchcock s.n. [Hodgeman Co., August 1895] (Ka). Jewell Co.: W. H. Horr 4368 (N); B. Osborn 863r (Ka--88363). Kearny Co.: A. S. Hitchcock s.n. [Kearney Co., Aug. 29, 1897] (Ka). Lane Co.: F. C. Gates 16684 (Ka--75855). Lincoln Co.: F. C. Gates 16492 (Ka--75806); A. S. Hitchcock s.n. [Lincoln Co., July 1895] (Ka). Logan Co.: A. S. Hitchcock s.n. [Winona, May 1895] (Ka). Meade Co.: A. S. Hitchcock s.n. [Meade Co., Sept. 1, 1897] (Ka); W. H. Horr s.n. [5/7/42] (Lw). Mitchell Co.: Carleton s.n. [May 19, '88] (Ka). Morton Co.: A. S. Hitchcock s.n. [Morton Co., August 1895] (Ka). Ness Co.: A. S. Hitchcock s.n. [Ness Co., August 1895] (Ka). Norton Co.: F. C.

Gates 17456 (Ka--79334), 18081 (Ka--88035). Osborne Co.: A. S. Hitchcock s.n. [Osborne Co., June 20, 1897] (Ka); Shear 38 (C). Ottawa Co.: Godlove 319 (Ka--93071). Pawnee Co.: A. S. Hitchcock s.n. [Pawnee Co., August 1895] (Ka). Philipps Co.: A. S. Hitchcock s.n. [Philipps Co., June 29] (Ka). Republic Co.: A. S. Hitchcock s.n. [Courtland, June 24, 1892] (Ka). Riley Co.: Birch s.n. [5-22-1899] (Ka); Carleton s.n. [Manhattan, May 31, 1886] (Ur, Ur), s.n. [May 31, 1886] (Ur); J. W. Finley s.n. [se. of Manhattan, May 27] (Ka); A. Nelson 8245 (N); S. Stewart s.n. [May 11] (Ka). Rooks Co.: E. Bartholomew s.n. [Rockport, June 12, 1889] (Ka); Clothier s.n. [Aug.-Sept. 1898] (Ka); Imler s.n. [Sep. 12, 1929] (Lw). Rush Co.: A. S. Hitchcock s.n. [Rush Co., August 1895] (Ka). Russell Co.: Carleton s.n. [June 25, 1885] (Ur); Kellerman s.n. [June 25, 1885] (Ka). Saline Co.: Carleton s.n. [7/28/1892] (Ka); Hancin 251 (Ka--76788). Sheridan Co.: C. Weber 36 (Ka--78147). Smith Co.: W. H. Horr E.108 (B, Mv, Ok, S, St, Tl, Ur, We), W. 108 (Ca--44951); Kellerman s.n. [Smith Center, July 10, 1888] (Ka). Thomas Co.: A. S. Hitchcock s.n. [Thomas Co., June 27, 1897] (Ka). Trego Co.: F. C. Gates 16666 (Ka--75838); M. Reed s.n. [July 8, 1892] (Ka), s.n. [July 1892] (Ka). Wabaunsee Co.: Bartley 1240 (N); W. H. Horr s.n. [April 28, 1939] (Lw). Washington Co.: Dodd 35 (Ka--80595), 58 (Ka--80595). County undetermined: W. M. Canby s.n. [western Kansas, July 1871] (Pa); Oyster 4672 (N); W. S. Rusby s.n. [n. west Kansas, 1878] (Cm). MISSOURI: Jackson Co.: B. F. Bush 4029 (S). County undetermined: L. H. Pammel s.n. [5/20/00] (Io--46199). ARKANSAS: Clark Co.: Demaree 16114 (N), 17198 (Du--256564, Gg--267601, It, Ky, N, N, N, Ok, Ur). Hempstead Co.: E. J. Palmer 8045 (Gg--182153, Mg--59). Izard Co.: F. W. Pennell 10696 (N), 17004 (Gg--267608). Miller Co.: Eggert s.n. [19 June 1898] (N). County undetermined: Nuttall s.n. [Red River] (C--isotype); Wibbe s.n. [9-10-79] (Al). LOUISIANA: Caddo Par.: Cocks s.n. [June 1908] (Tl). East Feliciana Par.: Drummond 194 (Lu), 212 (Lu). Rapides Par.: Ball 401 (N). Saint Mary Par.: Langlois s.n. [17.VII.1893] (I, N). Vermilion Par.: Langlois s.n. [28.V.1883] (I). COLORADO: Baca Co.: W. A. Weber 4588 (Ca--945347). NEBRASKA: Boyd Co.: F. E. Clements 2055 (Gg--31292), 2776 (Gg--31292, Ka). Furnas Co.: J. W. Barnhart s.n. [Hendley, June 4, 1885; Herb. J. H. Barnhart 134] (N). Sherman Co.: J. M. Winter s.n. [June 11, 1931] (Ob--50773). Valley Co.: C. Emig s.n. [Ord] (We). Webster Co.: H. Hapeman s.n. [Red Cloud, May 31, 1926] (Up). County undetermined: Swezey 104 (C). OKLAHOMA: Beaver Co.: G. W. Stevens 346 (N, St--9219). Beckham Co.: Demaree 12451 (Ok--20375, Ok--22233); J. Engleman 1737 (Ok); J. R. McFarland 84 (Ok); Neill 27 (Ok); Stratton 4302 (Ml, N, St--26135, St--26136); Waterfall 1998 (Ok,

St). Blaine Co.: J. Engleman 1272 (Ok). Bryan Co.: W. S. Blain s. n. [Durant, April 10, 1934] (Bt—29693); Bragg 2 (St—15632); C. S. Sheldon 48 (Se—14957). Caddo Co.: Graumann 17 (St—17578); Edw. Palmer 47 (N). Carter Co.: Demaree 12296 (Ba, Ok—22206, St-12969); Demmer 31 (Ok), 46 (Ok); M. Hopkins 4691 (Ok), 4714 (Ok, Ok), 4837 (Ok), 6094 (Ok); Hopkins, Nelson, & Nelson 1131 (Ok); Marian 38 (Ok); A. G. Payne 18 (Ok); Rinehart 193 (Ok). Choctaw Co.: Estes 93 (St—17572); Hopkins, Nelson, & Nelson 328 (Ca—742335, Ok); McAfee 46 (St—21503); Nelson, Nelson, & Goodman 5534 (Ok); Smith & Randall 73 (Ok); Spears 77 (Ca—882567, St—17566). Cimarron Co.: Rigney 129 (St—20028); Smith & Rinehart 82, in part (Ok); Stratton 449 (St—26130), 5195 (N, St—26153, St—26154); Waterfall 3144 (Ok), 9049 (Ok). Cleveland Co.: Babb 3 (Ok—10277); R. E. Chase 50 (Ok—10281), 97 (Ok—10280); Fielder s.n. [5/16/27] (Ok—10268); Hibbard 17 (Ok—10282); Louise Martin s.n. [6-22-28] (Ok—10271); Pitts s.n. [4/19/15] (Ok—20477, Ok, Or—18974). Comanche Co.: Buttram & Buttram 40 (Ok); M. K. Clemens 11751 (Ba, Gg—37142), s.n. [Fort Sill, Apr. 27, 1916] (Ba); C. T. Eskew 1663 (Ok), 1675 (Ok), 1750 (Ok); Hopkins, Nelson, & Nelson 801 (Au, Ca—742279, N, Ok, St—26115); M. L. Nelson 49 (Ok); C. S. Sheldon 48 (Al); Waterfall 13097 (St). Custer Co.: Mericle 1571 (Ok); Waterfall 1165 (Ok). Davis Co.: M. Hawkins 37, in part (Ok). Ellis Co.: Clifton 3085 (Po—127527), s.n. [Stevens 3085] (Ur). Garfield Co.: Gephardt 1016 (Ok). Garvin Co.: Kennedy 318 (Ok); E. J. Palmer 42063 (Ca—534758). Grady Co.: E. Morgan 566 (Ok). Greer Co.: Bailey & Bailey 10157 (Ba); Herb. Univ. Okla. 14899 (Ok). Harmon Co.: Sherrill 205 (Ok); G. W. Stevens 1108 (Ok, St—9222); Stratton 317 (St—26126); Waterfall 8330 (Ok, St). Harper Co.: G. W. Stevens 305 (Du—65246, Ok, Ok, St—9218, Ur). Jackson Co.: Demaree 12134 (Ok—22204), 12138 (Ok—20380), 12216 (Ok—20360); M. Hopkins 1024 (Ok), 3067 (Ok). Johnston Co.: Hopkins, Nelson, & Nelson 994 (Ok). Kay Co.: Kelting 231 (Ok). Kingfisher Co.: J. Engleman 1271 (Ok); Grace s.n. [June 27, 1935] (Ok—19063). Kiowa Co.: G. J. Goodman 6272 (Ok). Lamar Co.: Demaree 12003 (N). Logan Co.: J. Engleman 1273 (Ok); C. C. Smith 431 (Ok), 673 (Ok). Love Co.: McLennan 3 (Ok); Nelson, Nelson, Goodman, & Waterfall 5695 (Ok). Major Co.: J. R. McFarland 30 (Ok); Waterfall & Coryell 9921 (Ca—993896, St). Marshall Co.: G. J. Goodman 5817 (Ok), 5868 (Ca—81889, Ok); Waterfall 698 (N, Ok); A. Wilson s.n. [July 12, 1950] (Ok). McClain Co.: Demaree 12859 (Ok—22017, St—12968). McCurtain Co.: Keeling 84 (St—17570). Murray Co.: Beard 65 (St—9233); R. Bebb 4140 (Ok); Becker, Waterfall, & Kennedy 5299 (Ok), 5342 (Ok); Brenckle 48065 (N); Broadbent 48 (Ok); Coleman 19 (We); E. E. Dale 50 (Ok), 111 (Ok), 118 (Ok), 295

(Ok); Demaree 12242 (Ok--22221), 12277 (Ok--22162); Emig 43 (Cm), 788 (Cm); Fielder 4 (Ok--10261); Flowers s.n. [May 3, 1939] (Ok, Ok); Goltry 10 (St--14230); G. J. Goodman 2078 (Mn--26180, Ok--17969); G. E. Hall 59 (Ok); M. J. Hall 13 (Ok); Harden 108 (St--25040); M. Hopkins 2765 (Ok, St--15021), 2780 (Ok), 3959 (Ok), 4736 (S), 4771 (Ok), 4823 (Ok), 5178 (Ok), 6075 (Ok); Hopkins & Cross 6421 (Ok); Hopkins, Nelson, & Nelson 667 (Ca--742280, Ok), 709 (Ca--742338, Ok, St--26116); Jeffs s.n. [May 15, 1918] (Ok--10270); Kinnan 84 (Ok); Marian 25 (Ok); G. M. Merrill 283 (N); W. S. Myers 314 (Ok); P. M. Nelson 102 (Ok); Randal 44 (Ok); Rice 22 (Ok); K. Starks s.n. [16 July 1950] (Ok); G. W. Stevens 14 (Du--66651, Ok, Ok, St--9216, Ur); Stratton 10 (N, St--26118, St--26119); Van Valkenburgh 81 (Ok). Oklahoma Co.: Stedmen 79 (Ok); Waterfall 1982 (N, Ok, St--21491). Payne Co.: Ray 110 (Ok); Stiles s.n. [May 20, '97] (St--21930). Pontotoc Co.: B. E. Cole 94 (St--21678); D. McCoy 1149 (St); Prater 10 (Ok); Preston 90 (Gg--316093). Pushmataha Co.: Parker 21 (Ok). Smith Co.: G. W. Stevens 699, in part (Ok). Texas Co.: G. W. Stevens 427 (Du--65405, Ok, St--9212, Ur). Tillman Co.: Fleming 132, in part (Ok); C. C. Smith 1005 (Ok). Woods Co.: G. W. Stevens 699, in part (Du--66663, N, Ok--21373, Ok, St--9213, St--9214, Ur), 2850 (Ok), A.2850 (St--9215). Woodward Co.: G. J. Goodman 2388 (Ok). County undetermined: Carleton 177 (Ka, Ur); C. T. Eskew 1106 (Ok); G. W. Stevens 1202 (Ok), A.1063 (Ok), A.3085 (Ok); Van Vleet s.n. [Mt. Sheridan, 7/4/03] (Io--117045). TEXAS: Anderson Co.: Plank s.n. [Palestine, April 19, 1895] (N). Andrews Co.: Lundell & Lundell 11405 (Sm). Austin Co.: F. W. Pennell 10284 (N); Turner & Johnston 54345 (Au--121642); H. Wurzlow s.n. [Industry, 1891] (Ur). Bandera Co.: L. H. Bailey 7482 (Ba), 7501 (Ba), 7503 (Ba). Bastrop Co.: Duval s.n. [Bastrop, 1928] (W--1438667); Marrs s.n. [Smithville, 4-10-1930] (Ca--882571); Tharp 2817 (Du--206897). Baylor Co.: Bridge s.n. [near Seymour, 6/16] (Cn). Bee Co.: F. A. Barkley 16T423 (Au, N, Or--55386); F. W. Gould 6060 (Au--121653, Ca--985733); M. C. Johnston 541 (Au--121643, St); Lundell & Lundell 10055 (Ld, N); York & York 54035 (Au--121637). Bell Co.: Lundell & Lundell 10135 (N); McDaniel 14 (Nt), s.n. [Salado, Aug. 8, 1938] (Nt); C. L. York 46389 (Au); York & York 54022 (Au--121646). Bexar Co.: Balcom s.n. [San Antonio, April 1917] (Up--75578); A. Ball 4 (Au--121651); Barkley & Parsons 1 (Au, N); R. Bebb 2272 (Ok), s.n. [San Antonio, May 1, 1905] (Ur); Bogusch 199 (Ur); Clemens & Clemens 976, in part (Ba, Gg--37136, Po--69883); Collector undesignated s.n. [San Antonio, 1926] (Wi), s.n. (Sr); Groth 30 (N); G. Jermy s.n. [1904] (N), s.n. [San Anton.] (N); I. S. Jones 2209 (Po--158869), s.n. [Laurel Heights, Mar. 12, 1926] (Wi); May s.n. [3-18-26] (Wi);

McCullough 6 (Ok); Metz 79 (Gg—310895, I, N, Ok, Se—57949); Pagel s.n. [San Antonio, Mar. 1, 1926] (Wi); L. Richter s.n. [San Antonio] (Au); E. D. Schulz s.n. [San Antonio, March 25, 1817] (Mi), s.n. [San Antonio, March 18, 1918] (Mi), s.n. [San Antonio, 3-15-1921] (Wi), s.n. [San Antonio, 4/13/1922] (Wi); C. Skottsberg s.n. [Sibolo Creek, Selma, 1/6/1935] (Go); Small & Wherry 11968 (N). Blanco Co.: Bogusch s.n. [April 8, 1924] (Ob—50774); Lundell & Lundell 10274 (Ld, N). Borden Co.: Whitehouse 16746 (Sm). Bowie Co.: Letterman s.n. [Texarkana, Aug. 1880] (N). Brazoria Co.: Bush 449 (N). Brazos Co.: O. M. Ball 1504 [Reeves 199] (Cs); L. H. Pammel s.n. [7-1888] (Io—15341); Römer s.n. [Herb. Prager 18634] (Gg—31291). Brewster Co.: Warnock W.284 (Au). Brown Co.: Brenckle 48078 (N); F. W. Pennell 10481 (N); K. Stanford s.n. [Brownwood, 5-5-1931] (Au, Mi). Burleson Co.: Reeves 185 (N). Burnet Co.: C. C. Albers 38003 (Au, Au); Barkley & Copeland 38a (Au, N); F. W. Pennell 10469 (N); Warnock W.1096 (Au). Caldwell Co.: McBryde s.n. [Spr.-Sum. 1931] (Au, Au); Mercer s.n. [Fentress, 3-29-1931] (Au); Straudtmann s.n. [Dec. 30, 1936] (Au). Cameron Co.: R. Runyon 2495 (N, N), 4340 (Br, Ml, N, Ug); G. H. Thurber s.n. [Fort Brown, Feb. '57] (N). Carson Co.: A. M. Ferguson s.n. [4/3/01] (Au). Castro Co.: Rachaner 102 (Au). Childress Co.: Beazley s.n. [Carey, May 16, 1929] (Au); Wild Flower Contest s.n. [Childress, May 1930] (Au). Coleman Co.: Pruitt 228 (Au—121661); Shinners 26392 (Ur). Collier Co.: Lundell & Lundell 9295 (Ld, Mi, N), 9296* (Mi); McCart 1541 (Nt); F. J. H. Merrill s.n. [May 1, 1886] (C). Collingsworth Co.: Bailey & Bailey 10143 (Ba). Comal Co.: W. H. Kellogg 8 (Au); Lindheimer 10 (Ka), 1072 (Au, Br, Ca—147488, Me, Me, Me, Me, N), 1073 (Au, Br, Ca—147487, Me, Me, Me, N, Ok—10348, Up—48540); F. W. Pennell 5444 (N, Up—48540); F. W. Pennell 5444 (N, Up—72853); Rauterberg 1593 (Sm). Comanche Co.: Wild Flower Contest s.n. [Apr. 30, 1930] (Au). Cooke Co.: Correll & Correll 12989 (Sm); Newton 10 (Nt). Coryell Co.: Warnock 46413 (Au, N); Wolff 3458 (Tr). Crockett Co.: Cory 35469 (N, N); Warnock & McBryde 15313 (Au—123235). Crosby Co.: C. O. Erlanson 1135 (Mi), 1160 (Mi). Culberson Co.: Hitchcock & Stanford 6782 (Po—265508). Dallas Co.: R. Bebb 2456 (Ok), 1310 (Ok), 1374 (Ok); Boll s.n. [1871] (Cb); E. Brainerd s.n. [Dallas, March 28, 1908] (Vt); Bunker s.n. [May '42] (Ob—50762); Collector undesignated s.n. [Highland Park, 3-29-19] (Wi); A. B. Couch 3 (Ur); I. E. Diehl 13 (Po—71128); L. Goodwin 12 (Au—168948); Hamric & Thompson 8 (Au—172518); Hendrix 16 (Nt); Hynes s.n. [5-18-26] (Au, Au), s.n. [Spr.-Summer 1926] (N); B. Jones 6 (Nt); Lundell & Lundell 7056 (Mi, N, N), 8333 (Ld, Mi), 8534 (Ld, Mi, N), 9181 (Ld, Mi, N, N), 9137 (Ld, Mi, N), 9771 (Mi), 10416 (Ld,

N), 10568 (Ld, N), 11315 [Plant. Exsic. Gray. 1275] (Al, Au, Ca—702524, Dp—31802, Gg—308962, H—106661, I, Ka—95212, Ld, Mi, Ms, N, Ok, Or—49887, Or—49888, Pl—131196, S, Sm, St—23302, Tl, Ur, Vi, Vi, We), 11704 (N), 12132 (N); Ness s.n. [Aug. 7, 1925] (Tr); R. L. Oliver 76 (Nb); F. W. Pennell 5399 (Up—72783); J. Reverchon 739 (Up—17084), 1962 (Up—17087), 1962* (Bc, C, Ca-445518), s.n. [Curtiss 1962*] (Cm, I, Pa, Vt), s.n. [Dallas, May 1876] (Bc); O. Sanders 113 (Ld, Mi); Shinners 8576 (Sm); R. Spencer 5 (Nt); Storm 1019 (Ur); R. Van Vleet 78 (Au—121656), 120 (St). Deaf Smith Co.: C. L. Lundell 11457 (N). Denton Co.: Dobbins 16 (Nt); B. B. Harris s.n. [Spring '26] (Nt); Lundell & Lundell 9535 (Ld, Mi, N); McBryde 811 (Nt); McCart 1593 (Nt); Whitehouse 15590 (N). DeWitt Co.: M. Riedel s.n. [7-18-41] (Au). Dickens Co.: Parks & Cory 13620 (Tr). Duval Co.: M. E. Croft 20 (C), s.n. [San Diego, 1885] (Mi). Eastland Co.: Hodge Oak School 18 (Au, Au); Mrs. G. Robinson 18 (N); Warnock 46376 (Au). Edwards Co.: Cory s.n. [11-3-1936] (Md); Cutler 778 (Ba); M. E. Jones 26228 (Du—235289, Gg—237865, La, Mn—22402); Parks & Cory 6633 (Tr), 9035 (Tr), 20843 (Tr); Shreve 9925 (Fs). Ellis Co.: Cory 39243 (Au); Lundell & Lundell 9364 (Ld, Mi, N); O. Sanders 21 (Mi); Shackelford 3 (Nt); Turrell s.n. [Waxahachie, 3/18/1898] (Tu). Erath Co.: Gough s.n. [3-12-21] (Au); Hoisington 9 (Ok), 108 (Ok), 140 (Ok), 242 (Ok); Lundell & Lundell 10167 (Ld, N); Whitehouse 20675 (St); G. Williamson 13 (Nt). Fannin Co.: McCart 2032 (Au—121638, Au). Fayette Co.: Parks & Cory 10074 (Tr); Ripple 51-580 (Au—121647). Garza Co.: Ruth 107, in part (N). Gillespie Co.: F. A. Barkley 14522 (Vi); G. Jermy 182 (Ka); Mainland & Barkley 14522 (Au). Glasscock Co.: Cory 42069 (We). Goliad Co.: Lundell & Lundell 10059 (Ld, N); C. B. Williams 13 (Au). Gonzales Co.: C. C. Albers 35006 (Au); Friesner 10376 (Bt-40558); Pladeck s.n. [near Gonzales, 3-30-1940] (Bt—51164). Grayson Co.: Anderson & Hood 312 (Ok); R. Bebb 1410 (Ok, Ur); Center 17 (Nt); Harold Gentry 51-183 (Au—121611, Au—121683), 51-1781 (Au—121615); C. S. Sheldon s.n. [Denison, June 13, 1891] (Al); Sowder 24 (Au); M. M. Taylor 11 (Nt); Woodall s.n. [Denison, Apr. 4, 1930] (N), s.n. [Denison, Apr. 4, 1931] (Gg—316095). Grimes Co.: Sixth Grade Navasota s.n. [April 1934] (Au, Au); Wild Flower Contest s.n. [Navasota, Apr. 1934] (Au, Au). Guadalupe Co.: Johnston & McCart 5023 (Au—121613). Hansford Co.: Cutter 33, in part (Ok), 38 (S), 228 (Ok); G. J. Goodman 5286 (Au—121652, N, Ok). Hardeman Co.: Whitehouse 10784 (Sm). Harris Co.: Eifrig s.n. [Houston, June 1926] (Ca—882581, Mi); E. Hall 435, in part (Pr); Parks & Cory 8221 (Tr). Hays Co.: G. L. Fisher 49047 (Go); R. M. King 2615 (Au—181196); Krodel & Warnock 46529

(Au, N); Stanfield s.n. [July 1896] (N); Warnock & Krodel 19 (Au, Ml, N, N). Hemphill Co.: Tharp s.n. [Red Deer Cr., 6.16.29] (Au). Hidalgo Co.: Clover 1450 (N). Hill Co.: K. E. Smith s.n. [Itasca, 12-14-33] (Au). Hockley Co.: Rachaner 131, in part (Au, N). Hood Co.: Blackwell 64 (Nt); E. J. Palmer 6510 (Po--217509). Irion Co.: Wild Flower Contest s.n. [Mertzon, April 1932] (Au). Jack Co.: Mc Cart 892 (Nt); Whitehouse 15291 (Sm). Jefferson Co.: Brenckle 48069 (N); Lundell & Lundell 11232 (N). Jim Wells Co.: Freeborn & Freeborn 347 (N). Jones Co.: Mahler 1367 (St). Karnes Co.: J. C. Johnson 805 (Au--121660, Hk). Kaufman Co.: Ashworth 4 (Nt). Kerr Co.: V. L. Cory 51759 (N); M. E. Jones s.n. [between Kerrville and San Antonio, April 23, 1931] (Po--188428); Kelting 17 (Ok); White-house s.n. [June 8, 1929] (Au). Kimble Co.: Straudtmann s.n. [Aug. 19, 1941] (Au). Kinney Co.: Cory 28993 (N); Mearns 1274 (Du--24194), 1394 (Du--24192). Kleberg Co.: G. J. Harrison s.n. [Riviera, Feb. 24/30] (Gg--184907); Scholt 25 (Au, Au). Lamar Co.: Demaree 12003 (Ok--20373); McMullen s.n. [Paris, 5/11/27] (Au). La Salle Co.: Mauermann 12 (Au); Penfound s.n. [Cotulla, April 13, 1936] (Tl). La Vaca Co.: Johnston & McCart 5205 (Au--121607). Leon Co.: Tharp, Turner, & Johnston 54986 (Au--121644). Liberty Co.: Small & Wherry 11781 (N). Live Oak Co.: Tharp s.n. [March 22, 1931] (Au, Au, Au). Lubbock Co.: E. L. Reed 3943 (Au, Bl--42248). Lynn Co.: Rose-Innes & Moon 1052 (Au, N). Mason Co.: Dapprich 7770 (Sm). Maverick Co.: M. E. Jones 28300 (Ca--479297, Gg--237869, Po--188426), s.n. [Eagle Pass, April 27, 1931] (Du--239762); Schott s.n. [Eagle Pass] (N). McLennan Co.: Pudig & York 46382 (Au); L. D. Smith 21 (Au--121610, St), 197 (Au--121609), 410 (St), 730 (Au--121649), 905 (Au--121614); C. L. York 46087, in part (N), 46100, in part (Au). McMullen Co.: Thompson & Graham 65 (Au--123199). Menard Co.: Bottimer T.20 (Au--172720); Y. Jones s.n. [Fort McKavett, 4-1-1931] (Au); Mahoney s.n. [Menard, May 1, 1933] (Au, Au). Mills Co.: Egg s.n. [Jan. 7, 1931] (Au, N); Knowles s. n. [Goldthwaite, 4-10-1931] (Au). Montague Co.: McCart 1632 (Nt); Satterfield 21 (N, Nt). Navarro Co.: I. B. Bryant 12 (Nt); Gah-wiler 14 (Au); Matlock s.n. [Frost, 5-10-1932] (Au); L. M. Mc Clure 5 (Nt); E. J. Palmer 7821 (Gg--182152). Nolan Co.: Mrs. V. E. Stanfield s.n. [Sweetwater, 4-5-1931] (Au). Nueces Co.: A. A. Heller 1385 (Es, Mm--15396, Tu); F. W. Pennell 10337 (N); Tharp s.n. [11-9-39] (Au). Ochiltree Co.: C. S. Wallis 4885 (St). Old-ham Co.: Lambert & Lambert s.n. [August 19, 1939] (Up); Lundell & Lundell 11450 (N), 11462 (N). Orange Co.: Herb. Univ. Texas s. n. [Orange, Spring] (Au). Palo Pinto Co.: Anderson & Harty 10 (Nt); Harold Gentry 1282 (Au--121662); J. W. Gillespie 5223 (Du--210177). Parker Co.: S. M. Tracy 7999 (Au, Cm, Es, N, Vt); C. L.

York 22 (Au--121645). Randall Co.: Lundell & Lundell 11444 (Sm). Reagan Co.: Cory 53507 (N); Herb. Univ. Texas s.n. [Best, April 1931] (Au). Red River Co.: E. Adams 104 (Nt). Reeves Co.: Tracy & Earle 106, in part (Au). Roberts Co.: C. S. Wallis 4944-1, in part (St). Runnels Co.: F. W. Gould 7065 (Au--121626); J. C. Johnson 611 (Au--121608); Lundell & Lundell 10160 (Ld, N). San Patricio Co.: F. A. Barkley 16T409 (Au, N); Williges 336 (Au--179760). Sutton Co.: Cory 39625 (Au, N, N); Geib 4251 (Tr); Gould & Sperry 5733 (Au--121650, Ca--917764); M. E. Jones 28299 (Po--188406); Rohrbaugh 390 (Ok). Tarrant Co.: F. C. Gates 19134 (Ka--89646); H. Hapeman s.n. [Fort Worth, May '94] (Hp); H. N. Moldenke 6954 (N); E. Nash 13 (Nt); Ruth 83 (Au), 92 (Ll), 107, in part (Cm, Io--113644, Ka--67107, Mi, Mi, N, N, Sm, Up, Ur), 107a (Up), 110, in part (N), s.n. [Fort Worth, June 19, 1909] (Po--267675); Steimert s.n. [May 5, 1946] (Ok); L. F. Ward s.n. [Fort Worth, Sept. 9, 1877] (Bc), s.n. [Fort Worth, Sept. 1877] (Pa). Taylor Co.: Lundell & Lundell 11364 (N); Mahler 1312 (St); Tolstead 5783 (Ca--48977), 6927 (Au, Ca--882576, N); S. M. Tracy 8000 (Cm, N); Warnock 46352 (Au, N). Terrell Co.: Warnock & McBryde 14866 (Au--123218); G. L. Webster 150 (Au--121648). Throckmorton Co.: Wild Flower Contest s.n. [April 1934] (Au). Tom Green Co.: Cory 50566 (N, Sm); F. W. Pennell 10493 (N); R. W. Pohl 4741 (Sm); C. Smith 7 (Ok), 173x (Ok); Wolff 4159 (Tr). Travis Co.: C. C. Albers 33021 (Au), 34011 (Au, Au, Au); Barkley & Copeland 5 (Au, N), 76 (Au, N); Barkley & Rowell 44 (Au, N, N), 103 (Au, N); Berlandier 1449 (Lu); Biltmore Herb. 3654b (S, S), s.n. [6.VI.1903] (S); Birge 2957 (Au); Bogusch 423 (Mg--27), s.n. [w. of Austin, 2-16-1926] (Mi); Bogusch & Molby 2927 (Ur); Bot. 23 Univ. Texas s.n. [Deep Eddy, 4-30-36] (Au); Brues 19248 (Sm), 19797 (Sm); Cintron, Buechner, & Barkley 16T249 (Au, N, Ok, S); Cohn & Barkley 13252 (Au, Ca--882568, N); A. M. Ferguson 489 (Au--121641), s.n. [Oct. 12, 1900] (Au); Herb. Hort. Bot. Gothenb. s.n. [Austin, June 6, 1903] (Go); Herb. Univ. Texas s.n. [Austin, 6/25/27] (Au, Au); F. W. Johnson s.n. [Austin, Oct. 6, 1913] (N); J. C. Johnson 6032 (Au, N); Lundell & Lundell 8826 (Ld, Mi, N, N), 9095 (Ld, Mi, N); Mahler 1256 (St); McWilliams 4632 (Au); R. H. Painter 6 (Ka--71736); R. B. Payton 41 (Au); Ripperton & Barkley 14542a (Au, N); Rose & Russell 24129 (W--1369462); Rowell 7058 (Au); Rowell & Mann 7 (Au, N); Rugel s.n. [Austin] (Mi); Mrs. Smith s.n. [Austin, 5/1/35] (Au, Bt--24727, St--9207); Straudtmann s.n. [July 17, 1940] (Au); L. C. Taylor 3034 (Ca--697809); Tharp 44090 (Au, N), s.n. [Austin, Spring 1920] (Ca--882579, Ur), s.n. [Austin, 10.20.28] (Go), s.n. [Austin, 4/12/35] (Bt--25427, N, Sm, St--9208), s.n. [Austin, 5/9/35] (Au, St. 9209), s.n. [Austin, 3-1-37] (Ca--882574), s.n. [Austin, 2-23-39] (Mi), s.n. [Austin, 4/10/41] (Ca-

882573, Mv); Tharp & Warnock 46084 (Au); Tharp & York 50-168 (Au-121639); Thompson & Hamilton 3451 (Se--28357); Warnock 107 (Au), 46033 (Au, N); Webster 5 (Au, N); Werkenthin s.n. [Austin, 2.26. 15] (Io--102276); C. L. York 49004 (Au--121640); H. H. York s.n. [3-18-08] (Au); York & Wolf s.n. [Sept. 29, '08] (Au); M. S. Young 113, in part (Ur). Uvalde Co.: Cory 6133 (Tr); Lundell & Lundell 10263 (Ld, N), 10955 (N), 10958 (N), 10975 (N); Parks & Cory 18103 (Tr). Val Verde Co.: Farr s.n. [Del Rio, May 9, 1911] (Up--52679); M. E. Jones 26229 (Po--178358); Parks & Cory 20842 (Tr); Perry, Bigelow, Wright, & Schott 830 (C); Warnock & McBryde 15073 (Au--123265). Victoria Co.: E. J. Palmer 9098 (Du--205507, S); Shiller s.n. [Dacosta, May 2, 1928] (Au). Walker Co.: Dixon 561 (La, Po--159054, Po--159344, W--1521886); Warner s.n. [Huntsville, March] (Hu). Washington Co.: Brackett 253 (Au), s.n. [Apr. 1928] (Au, Au), s.n. [4-10-38] (Ca--882572); Reeves 186 (N). Webb Co.: Nickels s.n. [Laredo, April 1880] (Up--17085). Wichita Co.: Parks & Cory 13233 (Tr), 16234 (Tr); Whitehouse 9589 (N), 9609 (N). Williamson Co.: Bodin s.n. [Georgetown, Dec. 1889] (Ka); Lundell & Lundell 10369 (Ld, N); C. L. York 46207 (Au). Wilson Co.: Bogusch 764 (Mg--35); Edw. Palmer 1049 (Pa); Thompson & Graham 50 (Au--123190). Wise Co.: Newton 20 (Nt). Young Co.: S. Hayes 610 (Ms, N). County undetermined: Capt. Bolton s.n. [April 1895] (Ka); T. Drummond 194 (S), s.n. [Texas] (Sg--68315); Eifrig s.n. [Texas, 1924] (Ca--882582); L. Kern s.n. [May 17th] (Au); Lindheimer 232 (Ka), 289 (N, Pa, S), s.n. [Soutehrn Texas, 1849--51] (N), II.289 (Ca--248234); E. Meyer s.n. [1844] (M); Ruffner s.n. [N.W. Texas] (Pa); Schlottmann s.n. [1886] (Ah); Teas s.n. [So. Texas, June 1926] (Ba, Ba). NEW MEXICO: Dona Ana Co.: R. S. Ferris 1169 (Du--91550). Grant Co.: E. L. Greene s.n. [Near Silver City, Aug. 11, 1880] (Pa); O. B. Metcalfe 1231 (Bl--50341); Mulford 896 (Ur); W. Stewart s.n. [June 26, 1936] (Gg--267605, La); C. B. Wolf 2598 (Du--190979). Hidalgo Co.: L. Benson 7376 (Po--267660); Tucker 2441 (S, Z). Lincoln Co.: Wooton 363 (Ka, Po--267674). Luna Co.: Treakle s.n. [Deming, April 9, 1911] (Po--73867). Santa Fe Co.: F. S. Earle 84 (N); Heller & Heller 3536 [Herb. Barnhart 2904] (N); A. Nelson 11757 (S). Socorro Co.: R. S. Ferris 1187 (Du--91552); Ferris & Duncan 2292 (Du--126170); H. H. Rusby 337, in part (C, Pl--72002, Pr); Vasey s.n. [Socorro, May 1881] (S); Wooton s.n. [Devil's Park, Aug. 9, 1900] (We). Valencia Co.: Condit s.n. [Laguna, July 8, 1912] (Ca--195627); O. Degener 4853 (N); Nelson & Nelson 2187 (N). County undetermined: Lambert & Lambert s.n. [August 30, 1934] (Up); Mearns 108 (Du--24167); Parry, Bigelow, Wright, & Schott s.n. [below Donana] (C); H. H. Rusby 243 (Fc); C. Wright 1502 (T). ARIZONA: Apache Co.: L. Benson

9573, in part (Po—267652); R. S. Ferris 1218 (Du--91453). Cochise Co.: L. Benson 9467 (Po--267662); Blumer 1345, in part (Ka-60177, Tu); Carlson s.n. [Bisbee, June 2, 1915] (Gg—31426); O. M. Clark 4880 (B); R. S. Ferris 9933, in part (Mi); Fowler s.n. [Barfoot Park, 25.VI.1933] (La, La, La); L. N. Goodding 415 (N); Goodman & Hitchcock 1211 (Ca--426361, Mn, N); Hilend 747 (La); Kearney & Peebles 14234 (To); Kruckeberg 3864 (N); Kusche s.n. [Cave Creek Canyon, July 1927] (Gg—147070); Thornber s.n. [June 1, 1903] (Ur); Wiegand, Maguire, Richards, & Moeller 11150 (N); C. B. Wolf 2490 (Du—190874). Coconino Co.: Collom 902 (N); D. T. MacDougal 317 (Ca--104868, Dp, Io—38763, N, N, Tu); H. H. Rusby 337, in part (Ca--104830); Solbrig 2803 (Ca--177948). Gila Co.: Molohon 52 (Fc); Peebles & Smith 14093 (N); Whitehead 1645 (Mi). Graham Co.: Darrow, Phillips, & Pultz 1122 (Tu—10327); Kearney & Peebles 14153 (To); Peebles 12989 (To); Shreve 4367 (Ca--195158, Fs). Greenlee Co.: L. D. Benson 9467 (Du—326794, N); D. R. Goddard 650 (Ca--717818). Navajo Co.: H. S. Gentry 3822 (Ak—25770); Livingston, Livingston, & Thornber s.n. [Apache Camp, 8/10/06] (Tu); Luck s.n. [Taylor, Aug. 1, 1897] (Cm). Pima Co.: L. Benson 3322 (Po—267615); H. W. Graham 8-30-46 (Cm); Nelson & Nelson 1543 (Ur); Peebles & Harrison 2235 (La, S); Pringle s.n. [April 13, 1881] (Ll). Santa Cruz Co.: H. W. Graham 7-14-2 (Cm); Loomis, Peebles, Harrison, & Kearney 1348 (To); Peebles & Fulton 11489 (To). Yavapai Co.: L. Benson 7460 (Po—267661). MEXICO: Chihuahua: Dobie 35 (Au); M. E. Jones s.n. [Sept. 17, 1903] (Po—71134); A. Lee 42 (Au, N); F. W. Pennell 19252 (Me, N); Townsend & Barber 139, in part (Ca--138818, Me, N, Po—71126, Ur, Vt); S. S. White 2393 (Fs), 2543 (Fs); E. Wilkinson s.n. [Sept. 26, 1885] (Al). Coahuila: F. A. Barkley 16057 (Au); E. G. Marsh 1121 (St), 2148 (St); Edw. Palmer 1050 (Pa); Stanford, Retherford, & Northcraft 241 (N, Ur); Wynd & Mueller 450 (Mi, S, Ur, Ur). Durango: Forrer s.n. [September and October, 1881] (I, N); H. S. Gentry 6870 (Ak—22789); J. H. Maysilles 7039 (N), 7057 (Lm, N), 7472 (Mi). Guanajuato: G. L. Fisher s.n. [July 28, 1926] (Mg--34). Jalisco: Barkley, Webster, & Rowell 7659 (Au--167038, N); L. I. Davis s.n. [Jaday, July 6, 1959] (Au--171900, Au--171909). México: G. L. Fisher s.n. [July 24, 1924] (Mv); Matuda 26384 (Cb). Michoacán: Hinton 13125, in part (Mi). Puebla: Barkley, Rowell, & Webster 2458 (Au—123245, N); L. I. Davis 226 (N), 233 (N). Tabasco: L. I. Davis 1 (N), 3 (N). Tamaulipas: Collector undesignated 312 (B). CULTIVATED: Belgium: Herb. Jard. Bot. Brux. s.n. (Br). France: Boucher s.n. [1819] (Du--166480). Italy: Herb. Harvey s. n. [h. R. P. 1819] (Du—166491), s.n. [h. R. P., julio 1843] (Du—166492). Massachusetts: R. E. Torrey s.n. [Amherst, Sept. 6,

1940] (Ms). New Jersey: G. H. M. Lawrence P.237 (Ba), P.353 (Ba). New York: H. N. Moldenke 11284 (N, N, N). South Dakota: Barr 101 (Ba). West Virginia: Davis & Davis 6259 (We). LOCALITY OF COLLECTION UNDETERMINED: F. V. Hayden s.n. [Yellowstone, etc., 1853—4] (Dt).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry, Ann. Mo. Bot. Gard. 20: 325—326. 1933.

Synonymy: Verbena bipinnatifida var. latiloba Perry ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena bipinnatifida latilobata Perry ex Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209. 1951.

Literature: Perry, Ann. Mo. Bot. Gard. 20: 311, 325—326, & 355. 1933; Sperry, Sul Ross State Teach. Coll. Bull. 22: 41. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 12, 14, 18, & 101. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 18 & 40. 1942; Moldenke, Phytologia 2: 127. 1944; Moldenke, Castanea 10: 39. 1945; Moldenke, Alph. List Cit. 1: 46, 143, 164, 169, 193, 209, 242, 244, 270, 274, & 290. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 22. 1947; Moldenke, Phytologia 2: 347. 1947; Moldenke, Wrightia 1: 232. 1948; Moldenke, Alph. List Cit. 2: 465, 470, 472, 477, 483, 497, 538, 542, 597, 604, & 629 (1948), 3: 656, 767, 807, 808, 828, 833, 952, & 954 (1949), and 4: 996, 1071, 1121, 1123, 1170, 1189, & 1290. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 23, 25, 26, 32, 163, & 197. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2210. 1951; Moldenke, Phytologia 3: 467. 1951; Moldenke, Résumé 21, 25, 28, 31, 38, 223, 358, & 470. 1959; Moldenke, Résumé Suppl. 2: 3. 1960.

This variety differs from the typical form of the species in its 3-cleft (trifid) leaves, with the segments remotely incised or lobed, the ultimate segments much broader than in the typical form. The plant is perennial, erect and to 30 cm. tall or else procumbent, the lateral branches procumbent, the leaf-blades strigillose above but hirtellous-hirsute (especially on the venation) beneath, the spikes compact or somewhat elongate in age, the bractlets variable in length, usually equaling or exceeding the calyx, the floral and fruit characters in general similar to those of the typical form, the corolla described as light-rose, pink, lavender, or purple, and the connective-glands (according to Kearney) considerably surpassing the anther-cells.

The type of the variety was collected by Carl Vilhelm Hartman (no. 906) between San Pedro and Fronteras, Sonora, Mexico, between September 20 and 24, 1890, and is deposited in the Gray Herbarium of Harvard University. Collectors have found the variety in canyons and river bottoms, on mountainsides and gravelly hillsides, burned-over pinelands, subalpine meadows, rocky slopes, steep gravelly slopes, and semi-timbered slopes, in oak woodlands and waste places, along roadsides, at the edge of cornfields, and in rocky terrain on canyon slopes, at altitudes of 4350 to 8400

feet. Brown found it to be "sparse in pasture" in Brewster County, Texas. Ferris reports that it forms a groundcover with Helenium hoopesii A. Gray, Delphinium, Artemisia, and Pteris in Cochise County, Arizona; in the same county Blumer found it in "rolling andesitic pineland recently lumbered". Tucker encountered it on steep southeast-facing slopes in shrubby growth of Quercus arizonica Sarg., Q. emoryi Torr., and Pinus cembroides Zucc. Mueller describes it as "sparse on grassy slopes" in Chihuahua.

The variety differs chiefly from the typical form of the species in its foliar characters. It has been collected in anthesis and in fruit in February, April, and June to October. Material in herbaria has been misidentified and distributed as V. aubletia Jacq., V. bipinnatifida Nutt., V. canescens H.B.K., V. ciliata Benth., V. elegans H.B.K., and V. wrightii A. Gray. Davis emphasizes that it has "perfectly upright growth", but Hinton says "generally procumbent". The Bush 4029 material from Missouri is from "introduced" plants, according to the collector, but I assume that he does not mean cultivated; Miss Perry cites this collection, as well as Earle & Earle 526, as typical V. bipinnatifida. The Whiting & Sanders 756/913 from Oak Creek Canyon, cited below as from Yavapai County, Arizona, may actually have come from Coconino County, and the M. E. Jones s.n. [Santa Rita Mts., Aug. 24, 1903], cited from Pima County, may possibly have been collected in Santa Cruz County. The C. Wright 1503 cited by Miss Perry "in part" apparently is a mixture with V. tumidula Perry and V. wrightii A. Gray. She cites the following 14 specimens not as yet seen by me: ARIZONA: Cochise Co.: L. N. Goodding 883 (G); Griffiths 4833 (W); T. E. Wilcox s.n. [Fort Huachuca, Sept. 1894] (W). Pima Co.: Griffiths & Thornber 159 (W); M. E. Jones s.n. [Santa Rita Mts., 24 Aug. 1903] (W). MEXICO: Chihuahua: Nelson 4856 (G, W); C. Wright 1503, in part (G, N). Durango: Forrer s.n. [Sierra Madre west of Durango, Sept.—Oct. 1881] (F); Garcia 331 (W). Sonora: Hartman 880 (G), 906 (G—type); Murdoch s.n. [Cananea, 20 Aug.—1 Sept. 1914] (F). Miss Perry cites a Mearns s.n. [Flagstaff, 17 June 1887] on the basis of a specimen in the New York Botanical Garden herbarium — the specimen there, however, is Mearns 159 and is certainly this variety, but was annotated by her in 1932 as "V. bipinnatifida Nutt."

In all, 94 herbarium specimens have been examined by me.

Citations: MISSOURI: Jackson Co.: Bush 4029 (N). OKLAHOMA: Greer Co.: Logan 124 (Ok). Murray Co.: G. W. Stevens 14 (N). TEXAS: Brewster Co.: G. W. Brown B.107 (Au); Sperry 1492 (Om). Dallas Co.: B. Jones 6 (Ok). Hidalgo Co.: L. I. Davis 199 (N). NEW MEXICO: Chaves Co.: Earle & Earle 526 (N). Grant Co.: Blumer 60 (N). Otero Co.: Spalding 28 (Tu). County undetermined: C. Wright 1503, in part (Ca--247679), 1602 (T). ARIZONA: Cochise Co.: F. A. Barkley 14A611 (Au, Ca--743022); Blumer 1345 (N); R. S. Ferris 9933,

in part (Rs--26916); Fowler s.n. [Barfoot Park, 26.VI.1939] (La); L. N. Goodding 37 (N, Tu), 251 (N), 883 (N, Tu); Goodman & Hitchcock 1211 (Gg--183908); L. Henderson 26 (Au, Au); Hilend 678 (La); M. E. Jones s.n. [Sept. 3, 1903] (Po--71156); Kearney & Peebles 15117 (To); Kusche s.n. [Cave Creek Canyon, June 26--29, 1927] (Gg--147069); W. W. Price s.n. [Aug. 25, 1893] (Du--97116); J. J. Thornber 7024 (Tu), s.n. [Fort Lowell, April 25, 1903] (Ca--882580), s.n. [Dragoon Summit, Aug. 19, 1905] (Tu); T. E. Wilcox s.n. [Ft. Huachuca, Aug. 1893] (C). Coconino Co.: Fulton 9672 (To); Mearns 159 (C, N). Gila Co.: Dunkle 5226 (H--491); H. W. Graham 7-28-3 (Cm); Peebles & Smith 14093 (To); E. Sanders 803/2339 (To); J. Whitehead 1645 (N). Graham Co.: Humphrey, Anderson, Rinehart, & O'Donnal 712 (Tu); Kearney & Peebles 9781 (To), 9802 (To); Pultz & Phillips 1849 (Tu--16175). Pima Co.: M. E. Jones s.n. [Santa Rita Mts., Aug. 24, 1903] (Po--71159, Po--71160); C. B. Maguire s.n. [March 24, 1935] (N); J. J. Thornber s.n. [Fort Lowell, June 1, 1903] (Tu), s.n. [Tanque Verde, June 8, 1913] (Tu). Pinal Co.: Porter, Peebles, & Harrison 1741 (To). Santa Cruz Co.: Epling & Stewart s.n. [Patagonia, Sept. 4, 1936] (La); H. S. Gentry 3295 (Ak--23134); Kearney & Peebles 10130 (Gg--267609, Po--208646), 10543 (Mi, To); Peebles, Harrison, & Kearney 4549 (To); Whiting 1047 [Cat. 4414] (To). Yavapai Co.: Whiting & Sanders 756/913 (Tu). County undetermined: Toumey s.n. [Galiuro Mts., July 29, 1894] (N). MEXICO: Chihuahua: M. E. Jones s.n. [Sept. 11, 1903] (Po--69327), s.n. [Sept. 16, 1903] (Po--69328); Le Sueur 305 (Au), 461 (Au); C. H. Mueller 3347 (Ca--720107); F. W. Pennell 18732 (D--733975, W--1641278); Townsend & Barber 139, in part (Me); S. S. White 2393 (Mi), 2456 (Mi), 2543 (Mi). Durango: F. W. Pennell 18264 (D--733977, W--1641017). Michoacán: Hinton 13125, in part (Au, N, N, N). Sonora: Donnelly 5 (Ca--146398), 6a (Po--4003); Hartman 906 (Ca--924053--isotype); Tucker 3478 (Du--399532, Gg--413693); S. S. White 3131 (Mi, Mi), 3261 (Mi), 3731 (Mi). State undetermined: Née 109 (Q). CULTIVATED: Belgium: M. Martens s.n. (Br). Mexico: Halbinger & Reko 313 (N). LOCALITY OF COLLECTION UNDESIGNATED: Fremont s.n. [Expedition to California, 1845--7] (T); Herb. Bonpland s.n. (S).

xVERBENA BLANCHARDI Moldenke, Revist. Sudam. Bot. 4: 18. 1937.

Synonymy: Verbena angustifolia x hastata Blanchard ex Moldenke, Revist. Sudam. Bot. 4: 18, in syn. 1937. Verbena angustifolia x hastata Hill ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena hastata x angustifolia Hill ex Moldenke, Suppl.List Invalid Names 8, in syn. 1941. Verbena blanchardii Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 &

2210, sphalm. 1951. Verbena hastato-angustifolia Bebb, in herb.

Literature: Kanda, Bot. Gaz. 69: 54--71, pl. 6, fig. 8 & 9. 1920; Moldenke, Revist. Sudam. Bot. 4: 18. 1937; Moldenke, Prelim. Alph. List Invalid Names 44 & 48. 1940; F. C. Gates, Fl. Kans. 190. 1940; Moldenke, Suppl. List Invalid Names 7 & 8. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 2, 3, 6, 8, 11, 74, & 101. 1942; Moldenke, Alph. List Invalid Names 45, 47 & 50. 1942; Moldenke, Phytologia 2: 68, 72, & 114. 1945; Moldenke, Alph. List Cit. 1: 30, 31, 35, & 43. 1946; Moldenke, Phytologia 2: 326. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 24 & 26. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 50. 1948; Moldenke, Alph. List Cit. 2: 359, 515, & 538 (1948), 3: 828 & 879 (1949), and 4: 1208. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 3, 6, 12, 14, 16, 21, 163, & 197. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2210. 1951; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 126, 129, & 130 (1952) and pr. 2, 3: 126, 129, & 130. 1958; Moldenke, Am. Midl. Nat. 59: 343. 1958; Moldenke, Résumé 5, 9, 15, 18, 20, 26, 223, 357, 365, 366, 374, & 470. 1959.

Illustrations: Kanda, Bot. Gaz. 69: pl. 6, fig. 8 & 9. 1920; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 130 (1952) and pr. 2, 3: 130. 1958.

The type of this hybrid was collected by Lieutenant Ruffner at Lexington, Rockbridge County, Virginia, and is deposited in the Torrey Herbarium at the New York Botanical Garden. It is named in honor of William Henry Blanchard (1850--1922), American botanist and educator, well-known for his work on Rubus and on New England plants. The name xV. blanchardi has been proposed for the natural hybrid which occurs between V. simplex Lehm. and V. hastata L. where the ranges of these two species overlap in the eastern United States, and for artificial hybrids produced experimentally between these two species. The hybrid sometimes resembles one "parent", sometimes the other, in general habit. The leaves are generally broader, more acute, and with coarser pubescence and larger teeth than in V. simplex, more narrowly lanceolate or oblong-lanceolate than in V. hastata and never incised nor hastate. The fruit is produced sparingly and irregularly, whereas in both "parents" fruit production is usually heavy. Kanda (1920) gives a cytological discussion of the hybrid. It was apparently introduced into (or originated in) cultivation in 1854, but the Herb. Hort. Bot. Berol. s.n. [1854] specimen was annotated as V. hastata L. by Miss Perry.

The type of V. hastato-angustifolia was collected by Michael Schuck Bebb at Fountaindale, Winnebago County, Illinois, and is deposited in the Jesup Herbarium at Dartmouth College. The "Verbena simplex x hastata" of Gates, Fl. Kans. 190 (1940), if one may judge from the herbarium specimens which he has so annotated, is a mixture of V. simplex Lehm. and V. simplex var. eggerti Moldenke. I have not as yet seen any specimens so annotated by

Gates that are the hybrid which he suggests. It may, therefore, be that the Kansas records which he gives -- and which I have copied, on his authority, in my "Résumé" (1959) -- from Butler, Cherokee, Douglas, Lyon, Montgomery, Neosho, and Osage Counties actually do not apply to this hybrid. Similarly, the "Verbena angustifolia x hastata" of Jacobs is typical V. simplex Lehm.

Collectors report finding xV. blanchardi in dry fields, grassy ground, and on roadside banks and railway rights-of-way, flowering from June to August and fruiting in June and August. They report the common names "blue vervain" and "false vervain" -- the former also applies to V. hastata L., and the latter to V. hastata and to V. litoralis H.B.K. In herbaria it has been variously misidentified and distributed as V. angustifolia Michx., V. engelmannii Moldenke, V. hastata L., V. paniculata Lam., V. rugosa Willd., and V. stricta Vent. The corollas are described as pale-blue or violet to lilac-blue. In all, 15 herbarium specimens, including the types of all the names involved, have been examined by me.

Citations: VERMONT: Bennington Co.: W. H. Blanchard 162 (N). VIRGINIA: Rockbridge Co.: Ruffner s.n. (T--type). ILLINOIS: Cook Co.: E. J. Hill 161.1898 (Ur), 162.1898 (Ur, Ur). Winnebago Co.: M. S. Bebb s.n. [Fountaindale] (Dt). Stony Island: H. H. Smith 5952 (Ca--882824), 5982 (Ca--882823). KENTUCKY: Warren Co.: S. N. Price s.n. [Bowling Green, July 29, 1899] (N). OKLAHOMA: Latimer Co.: F. A. Barkley 1219 (Ok--10312), s.n. [6/20/28] (Ok--10313). Marshall Co.: G. J. Goodman 5418 (St). Wagoner Co.: R. Bebb 4324 (Ok). CULTIVATED: Germany: Herb. Hort. Bot. Berol. s.n. [1854] (N). LOCALITY OF COLLECTION UNDESIGNATED: Collector undesignated 43 (Q).

VERBENA BONARIENSIS L., Sp. Pl., ed. 1, 20. 1753 [not V. bonariensis Rendle, 1904, nor Schau., 1960].

Synonymy: Verbena bonariensis altissima, lavandulae canariensis spica multiplici Dill., Hort. Eltham. 406. 1732. Verbena bonariensis. Lavandulae canar. spica multiplici Dill., Hort. Eltham. pl. 300, fig. 387. 1732. Verbena foliis lanceolatis, floribus congestis fastigiatis L., Hort. Cliff. 11. 1737. Verbena bonariensis altissima, lavandulae canariensis spica multiplici Dill. ex L., Hort. Cliff. 11, in syn. 1737. Verbena tetrandra, spicis fasciculatis, foliis lanceolatis amplexicaulibus L., Hort. Upsal. 8. 1748. Verbena bonariensis altissima, lavandulae canariensis folio, spica lavandulae Dill. apud L., Sp. Pl., ed. 1, 20, in syn. 1753. Verbena bonariensis altissima spica lavandulae Dill. ex Sabbat in Martelli, Hort. Roman. 3: 10. 1775. Verbena elongata Salisb., Prodr. 71. 1796. Verbena trichotoma Moench, Suppl. Meth. Plant. 131. 1802. Veronica bonariensis, altissima,

lavandulae canariensis folio, spicâ lavandulae Dill. apud Poir. in Lam., Encycl. Meth. Bot. 8: 549, in syn. 1808. Verbena spicis brevibus, subfasciculatis; foliis oblongo-lanceolatis, amplexicaulibus Lam. apud Poir. in Lam., Encycl. Meth. Bot. 8: 549, in syn. 1808. Verbena (bonariensis), tetrandra, spicis fasciculatis; foliis lanceolatis, amplexicaulibus L. apud Poir. in Lam., Encycl. Meth. Bot. 8: 549, in syn. 1808. Verbena quadrangularis Vell., Fl. Flum. 16 (1825) and Icon. 1: pl. 39. 1827. Verbena bonariensis altissima lavandulae canariensis folio et spica Dill. apud Walp., Repert. 4: 19, in syn. 1845. Verbena corymbosa Hort. ex Walp., Repert. 4: 19, in syn. 1845 [not V. corymbosa Cham., 1832, nor Relh., 1947, nor Ruíz & Pav., 1798]. Verbena bonariensis γ longibracteata Walp., Repert. 4: 20. 1845 [not V. bonariensis var. longibracteata Kuntze, 1893]. Verbena bonariensis Dill. ex Goncalves de Cunha & Goncalves Sobrinho, Rev. Fac. Ciencias 3: 10 & 43. 1938. Verbena fonariensis L. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena bonariesis L. apud Stellfeld, Trib. Farm. [Vellozoa] 12: 45, sphalm. 1944. Verbena bonatiensis L. ex Moldenke, Alph. List Cit. 1: 284, sphalm. 1946. Berbena bonariensis L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 2, in syn. 1947. Verbena bonariense L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena hasta L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 24, in syn. 1947. Cymaria idjenensis Koord. ex Moldenke, Résumé 276, in syn. 1959. Verbena bonaerensis Larrañ. ex Moldenke, Résumé 358, in syn. 1959. Verbena bonariensis Vell. ex Moldenke, Résumé 359, in syn. 1959. Verbena bonariensis f. umbrosa Osten ex Moldenke, Résumé 359, in syn. 1959. Verbena littoralis H. Betch. ex Moldenke, Résumé 368, in syn. 1959 [not V. littoralis Humb., 1959, nor H. & B., 1947, nor H.B.K., 1845, nor Kunth, 1847, nor L., 1946].

Literature: Dill., Hort. Eltham. 406, pl. 300, fig. 387. 1732; L., Hort. Cliff. 11. 1737; A. van Royen, Fl. Leyd. Prod. 326. 1740; L., Hort. Upsal. 8. 1748; L., Sp. Pl., ed. 1, 20. 1753; Kniphof, Bot. Orig. Herb. Viv. pl. [284]. 1757; L., Syst. Nat., ed. 10, 852. 1759; Kniphof, Herb. Viv. 2: no. 98, pl. 1155. 1764; Mill., Gard. Dict., ed. 8, no. 6. 1768; J. A. Murr. in L., Syst. Veg., ed. 13, 62. 1774; Dill., Hort. Eltham. Add. Denom. Linn. pl. 300. 1774; Sabbat in Martelli, Hort. Roman. 3: 10, pl. 54. 1775; Christm. & Panzer, Vollst. Pflanzensyst. Houttuyn 5: 125--126. 1779; Gaertn., Fruct. & Sem. 1: 315, pl. 66, fig. 1. 1788; Lam., Tabl. Encycl. Méth. Bot. [Illustr.] 1: 57, pl. 17, fig. 2. 1791; R. A. Salisb., Prodr. 71. 1796; Willd., Sp. Pl. 1: 117--118. 1797; Thunb., Prodr. Pl. Cap. 96. 1800; Moench, Suppl. Meth. Plant. 131. 1802; Poir. in Lam., Encycl. Méth. Bot. 8: 549—550. 1808; Mirbel, Ann. Mus. Hist. Nat. Paris 15: 260, pl. 14 (2), fig. 4. 1810:, J. Sm. in Rees,

Cycl. 36: no. 6. 1817; Steud., Nom. Bot., ed. 1, 874. 1821; Thunb., Fl. Cap., ed. Schultes, 447 & 799. 1823; Vell., Fl. Flum. 16 (1825) and Icon. 1: pl. 39. 1827; Sweet, Hort. Brit., ed. 2, 418. 1830; Hook., Bot. Misc. 2: 166. 1831; Hook. & Arn., Bot. Beech. Voy. 67. 1832; Cham., Linnaea 7: 255. 1832; Bojer, Hort. Maurit. 254. 1837; E. Mey., Comm. Pl. Afr. Austr. 1: 274. 1837; H. E. Richter, Cod. Bot. Linn. 35. 1840; Hook. & Arn., Bot. Beech. Voy. 484. 1841; Walp., Repert. 4: 19—20. 1845; Schau. in A. DC., Prodr. 11: 541—542. 1847; C. Gay, Hist. Fis. Chile Bot. 5: 21—22. 1849; Schau. in Mart., Fl. Bras. 9: 187 & 189. 1851; R. A. Phil., Linnaea 33: 195. 1864; H. Mann, Enum. Haw. Pl. 194. 1867; R. A. Phil., Anal. Univ. Chil. 35: 192. 1870; Ulrich, Internat. Würterb. Pfl., ed. 1, 249 (1872) and ed. 2, 249. 1875; Benth. in Benth. & Hook. f., Gen. Pl. 2 (2): 1146. 1876; J. G. Baker, Fl. Maurit. & Seych. 252. 1877; Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 1, 150. 1878; Pickering, Chron. Hist. Pl. 1011 & 1220. 1879; Griseb., Abh. K. Gesell. Wiss. Götting. 24 [Symb. Fl. Argent.]: 276. 1879; Vell., Fl. Flum. repr. 17. 1881; Ball, Journ. Linn. Soc. Lond. Bot. 21: 230. 1884; C. B. Clarke in Hook. f., Fl. Brit. Ind. 4: 565. 1885; Lillo, Fl. Tucuman 94. 1888; A. W. Chapm., Fl. South. U. S., ed. 2, 636. 1889; Ball, Journ. Linn. Soc. Lond. Bot. 27: 496—497. 1891; Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 198. 1892; Fawcett, Prov. List Indig. Nat. Flow. Pl. Jamaic. 30. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 146. 1894; Rusby, Mem. Torrey Bot. Club 4: 245. 1895; Jacks., Ind. Kew. 2: 1178—1179. 1895; A. W. Chapm., Fl. South. U. S., ed. 3, 368. 1897; Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 18. 1900; Chod., Bull. Herb. Boiss., sér. 2, 2: 818 [Plant. Hassler. 9: 197]. 1902; Speg., Anal. Soc. Cient. Argent. 53 [Nov. Add. Fl. Patag. 2: repr. 72]: 249. 1902; Small, Fl. Southeast. U. S., ed. 1, 1010. 1903; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 291. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4:1057. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 479. 1904; Briq., Arkiv Bot. 2 (10): 10. 1904; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patag. 8 (2): 684. 1905; Agric. Gaz. N. S. Wales 17: 800. 1906; F. M. Bailey, Weeds & Poison. Pl. Queensl. 143. 1906; Hayek, Denkschr. Kaiser. Akad. Wissen. Math.-nat. 79 (1): 294. 1908; Hayek in Engl., Bot. Jahrb. 42: 162. 1908; Hassler, Flor. Pilc. 101. 1909; Reiche, Fl. Chile 5: 283 & 284. 1910; H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 207—209. 1910; Hicken, Chloris Plat. Argent. 195. 1910; Gerth van Wijk, Dict. Plantnames 1397—1398. 1911; Guillaumin, Ann. Mus. Colon. Marseille 9: 206. 1911; Small, Fl. Southeast. U. S., ed. 2, 1010. 1913; Hauman-Merck, Anal. Mus. Argent. Hist. Nat. Buenos Aires 24: 415. 1913; F. M. Bailey, Compreh. Cat. Queensl. Pl. 382. 1913; Fyson, Fl. Nilgiri & Pulney Hill-tops 2: 214. 1915; Hicken, Physis 2: 114. 1916; Britton, Fl. Bermuda 311. 1918; Alvarez, Fl. Santiago del Est. 106. 1919; Sanzin, Anal. Soc. Cient. Argent. Buenos Aires 88: 96, 98, 114, 115, & 134. 1919; Molfino, Physis 5: 285. 1921; Pellett, Am. Honey Pl., ed. 2, 420—421. 1923; Rep. Bot. Exch. Club Brit. Isles 1922: 617. 1923; Stearn, Flora Batava 27: pl. 2093. 1925—1930; J. M. Black, Fl.

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Illustrations: Dill., Hort. Eltham. pl. 300, fig. 387. 1732; Kniphof, Herb. Viv. pl. [284] (in color) (1757) and 2: pl. 1155 (in color). 1764; Dill., Hort. Eltham. Add. Denom. Linn. pl. 300. 1774; Sabbat in Martelli, Hort. Roman. 3: pl. 54 (in color). 1775; Gaertn., Fruct. & Sem. 1: pl. 66, fig. 1. 1788; Lam., Illustr. 1: pl. 17, fig. 2. 1791; Mirbel, Ann. Mus. Hist. Nat. Paris 15: pl. 14 (2), fig. 4. 1810; Vell., Fl. Flum. Icon. 1: pl. 39. 1827; Agric. Gaz. N. S. Wales 17: 800. 1906; F. M. Bailey, Weeds & Poison Pl. Queensl. 143. 1906; Fyson, Fl. Nilgiri & Pulney Hill-tops 2: 214. 1915; Britton, Fl. Bermuda 311. 1918; Sansin, Anal. Soc. Cient. Argent. Buenos Aires 88: 115. 1919; Stearn, Flora Batava 27: pl. 2093. 1925--1930; St. John & Hosaka, Univ. Hawaii Res. Publ. 6: 132. 1932; Dermen, Cytologia 7: 163, fig. 19. 1936; Troncoso, Darwiniana 3: 481, fig. 3 a--d. 1939; Augusto, Fl. Rio Grande do Sul fig. 99. 1946; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2210. 1951; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 128 (1952) and pr. 2, 3: 128. 1958.

Coarse erect perennial or annual herb, 0.3--2 m. tall, usually robust, deep-green throughout, often suffrutescent, sometimes in clumps 1 m. wide, with a taproot; stems strict, sharply and conspicuously tetragonal, somewhat scabrous-pubescent, hispidulous, or subvillous, especially on the angles, often 3-branched at the base, often rather naked above; leaves decussate-opposite, sessile, lanceolate or oblong-lanceolate, 4.5--13 cm. long, 0.6--2 cm. wide, the lower ones usually 9--13 cm. long and 1--1.5 cm. wide, all acute at the apex, cordate and subauriculate and adnate-semiamplexicaul at the base, sharply and unequally serrate along the margins from below the middle or incised-serrate, entire toward the base, rugose and hirtellous above, spreading-pubescent beneath, particularly along the prominently reticulate veins, or hirsute and scabrous on both surfaces, penninerved, venose, the margins revolute; inflorescence paniculate, terminal, cymose, fastigiate; spikes many-flowered, compact and aggregated, mostly short, eventually cylindric, 4--10 in number, commonly sessile or subsessile and crowded in dense fasciculate long-pedunculate cymes; bractlets lanceolate, acuminate at the apex, barely equaling or slightly surpassing the calyx, pubescent or hirtellous and ciliate, not glanduliferous; flowers very small or minute; calyx about 3 mm. long, pubescent, hispidulous on the angles, not glanduliferous, its lobes acute with short subulate tips; corolla varying from blue, bright-blue, reddish-blue, or blue-violet to violet, dark violet-purple, purple, bright-purple, red-purple, rosy-violet, lavender, rose-lavender, lavender-pinkish, lilac, dark-lilac, mauve, or even red, its tube scarcely twice the length of the calyx, pubescent on the outer surface, the limb small and inconspicuous, nearly regular; stamens didynamous, included; fruit splitting into 4 cylindric brown cocci included in the persistent calyx-tube, trigonous, about 2 mm. long, chiefly striate, slightly raised-reticulate at the apex, the dorsal side

3-striate, slightly cross-striate at one end, the commissural faces scarcely reaching the tip of the cocci, muricate-scabrous by being thickly set with strongly bulbous acute strigullae; chromosome number: x = 7, 2n = 28.

The type of this common and widespread species was collected in fields at Buenos Aires, Argentina, and is sheet no. 11 under genus 35 in the Linnean Herbarium at London. The species is apparantly originally native to the area from Brazil and Bolivia south through Paraguay and Uruguay to Argentina and west to Chile, but has been introduced into and is now wild in Colombia, Ecuador, and Peru, as well as in the United States [Massachusetts, New Jersey, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, Texas, Oregon, and California], Bermuda, Jamaica, St. Helena, the Azores and Canary Islands, England, Sweden, Portugal, Spain, Switzerland, Kenya, Congo Leopoldville, Southern Rhodesia, Republic of South Africa, Malgache Republic, Mauritius, Réunion, Pakistan, India, Ceylon, Malaya, Java, the Hawaiian and Fiji Islands, New Caledonia, Loyalty Islands, Australia, New Guinea, Bribie and Double Islands, New Zealan, and Pitcairn Island. It was apparently introduced into cultivation in 1737 in Sweden and is now known from gardens in Ontario, Massachusetts, New York, New Jersey, Maryland, Oklahoma, British Guiana, Peru, Sweden, England, Belgium, France, Germany, Romania, the Canary Islands, Congo Leopoldville, India, and Java. Degener reports that it is sparingly naturalized in pastures on Molokai, while MacMillan (1943) reports it as naturalized near up-country gardens in Ceylon. Meebold found it near Indian settlements on Viti Levu and was of the opinion that it was "probably brought from India". It is recorded from Terceira in the Azores by Gonçalves de Cunha & Gonçalves Sobrinho on the authority of Trelease (1897) and Tultén & Warburg (1932) in the works cited above (1938 and 1941). Ball (1891) quites W. Andrews about its occurrence in Patagonia: "Plant with tall upright stem to a height of from 4 to 6 feet; very small deep-purple blossoms in clusters at point of long stems. Decoctions of this are much used to bathe bruises. Foliage of a dark green and rough to the touch. Grows in clayey soil, especially near streams, lakes, &c." Ball continues "This species appears to be a genuine cosmopolite, extending to the warm temperate regions of the earth, though doubtless in many stations (for instance, the Canary Islands) it has been introduced by human agency." In Queensland it is describe by L. S. Smith as a "tall erect weed fairly common along roadsides."

Collector report that the species in its native habitats is found along roadsides, in dry fields, waste places and dry or sandy waste land, ditches, and moist flat land, on dumps, river flats, and canal banks, on or near river banks, along trails and railroad rights-of-way, along fences in rice fields, in swamps and open places in live oak forests, in wet sandy open ground or waste valley land, in pastures, deep woods, and the margins of old Taxodium swamps, in clearings in woods, irrigation ditches,

sandy woods, and vacant lots, in fertile fields and marshes, on ballast, and in clay loam, sand, or sandy loam soil, most often in rather dry soil of old fields. It is described from wet sandy open ground, waste land, and wet places, in Lufkin sandy loam, in moist ditches and sandy bottoms, on campos and hills, in moist loam at the edge of fields, in rocky soil of mountains, and open ground on mountaintops, on open mountain slopes, in moist ground, campo bogs, damp woods, campos between woods, and low places, along fencerows and the edge of woods, at the edge of water or even in 6 inches of water, and in the neighborhood of cultivated ground, on islands and shores, along creeks running through woods, in fertile soil on the banks of ditches, in open low velt woodland, in the full sun in sandy soil on railroad embankments, hill pastures, and cultivated ground. It has been collected at altitudes from sea level to 2900 meters, blooming in every month of the year, fruiting from April to October and in February and December. Caldevilla says that the species is "common in swamps" in Uruguay, while Legrand found it there "en un baldio del balneario" and "cerca dubañado del balneario". Gallinal and his associates report it from fertile fields and marshes and as "rare" in Uruguay. Herter reports that at Montevideo it grows in sandy dry soil along roadsides exposed to sunlight.

Henderson found it on ballast in Oregon. In Natal it is said by West to be a weed on old lands, while McClean describes it as a weed in cultivated lands, gradually penetrating into grasslands and scrub. In Bermuda it is "common" according to Collins, and in Jamaica it is described by Harris as a "common weed in open places and old vegetable gardens", Philippi (1870) reports it as common in the province of Valdivia, Chile, and Jörgensen affirms that it is very common at Villa Rica in Paraguay; Kuntze says "introduced like wild in Australia". Repton reports it as "common" in the Transvaal. Mann, in the reference cited above, says that it has been introduced and has become a very troublesome weed in the Hawaiian Islands, but surely he refers here to V. litoralis H.B.K. We found the latter to be extremely common in most parts of the larger Hawaiian Islands on our travels there in 1961, but did not encounter V. bonariensis at all.

V. bonariensis is said by Heller to be "plentiful along the Yuba river 5 miles east of Marysville", California, where, he says, it is a "striking species". Wolf also refers to it as "abundant here". It is not listed in Jepson's "A Manual of the Flowering Plants of California" (1923—1925). Carter & Bowerman describe it from the same area as a perennial up to 4 feet tall, with lavender corollas, on moist or flooded ground along drainage ditches, "common but occurring intermittently". Jepson in 1943 records it from Merced and Solano Counties, California. Eastwood (1932) says "This verbena from Argentina has appeared in several localities in California. It was first noted by Mr. J. W. Stacey between Alto and Mill Valley, in Marin County, where the clustered spikes overtop the high, dense vegetation along the railroad track. It has been collected also at Collinsville, Solano County, by Miss C. E.

Smith, and along the Merced River between Snelling and the bridge, Merced County, by J. T. Howell." Carter found it "in loam along ditch with Lotus americanus, Rumex crispus, Melilotus alba, Helianthus annuus, and Cuscuta sp." in Fresno County.

Murrill (1945) reports it as rare in Alachua County, Florida. The Stacey s.n. [Oct. 27, 1924] specimen in the herbarium of the California Academy of Sciences bears a notation "first record from California", but this is not true, since Hainey collected the species at Marysville as far back as 1920, although he called it "Verbena hastata perhaps hybrid". Mason & Smith found it to have a taproot in 6 inches of water of fresh stream in Merced County, while Nabs & Smith found it by a runoff ditch, probably dry part of the year, in Stanislaus County, and Crampton encountered it in sandy soil along ditchbanks with Holcus halepensis and Setaria geniculata in Merced County.

Verbena bonariensis is cited by Raimondi (1943) from Arequipa, Peru, on the basis of his no. 9112, not as yet seen by me. Schallert calls it a "weed" in sandy soil along roadsides, "introduced around Charleston, especially common on Sullivan's Island", South Carolina. Wolf & Stark found it "abundant in sun in moist loam at edge of fields" in Yuba County, California, while Cory says it is "infrequent in sandy woods" in Jasper County, Texas. Cabrera & Dawson describe it as a hemicryptophyte.

Sabbat (1775) regarded the pre-linnean Verbena americana, spica multiplici, foliis urticae angustissimis, floribus caeruleis Herm. and Verbena altissima, americana Herm. as belonging in the synonymy of V. bonariensis. Actually, they belong with V. hastata L. The "Hook., Bot. Misc. 2: 166" reference sometimes cited for V. bonariensis seems to be an error, since I am unable to find any such reference.

Chamisso (1832) says "Ad fretum Stae. Catharinae legimus ipsi, misitque Sellowius in Brasilia meridionali 'Salto' aliisque locis nec non in Brasilia aequinoctiali copiose lectam. Occurrit et memoratu digna varietas villosior, bracteis longioribus apice recurvis." Reiche (1910) comments "A esta especie en el Herb. Mus. Nac. i en el Catalog. plant. vasc. chil. se refieren algunas muestras con las hojas del medio de 4--6 cm. de largo. Mui afin a V. hispida. En las provincias centrales i australes (Valdivia, Corral i Osorno)."

The Herb. W. H. Harvey s.n. [h. P. 1820] in the Dudley Herbarium is said to have been grown from seeds received from Buenos Aires, while O. R. Holmberg s.n. [22/9/1911] in the University of Lund herbarium was grown from seeds sent by Dusén from Paraná, Brazil. Bojer (1837) says that on Mauritius it "croit dans les plaines fertiles des quartiers des Plaines" and blooms all through the year. Baker (1877) says "naturalised plentifully in Mauritius in fields and by roadsides", while Vaughan calls it "a common weed" there. Burkill describes it from Pahang as "semiwoody erect herb to 2 ft.; rough square stems; coarse leaves; compact terminal

inflorescences; flowers purple; opensward, alt. 6600 ft.; only one previous collection for Malaya, from Tanah Rata at 4750 ft. alt." MacMillan (1943) speaks of the leaves as "deeply cut". Harper writes that the species is found on railroad rights-of-way in Tuscaloosa County, Alabama, "apparently a recent introduction here; commoner around seaports, such as Mobile, Pensacola, and Charleston; but also seen since near Birmingham." Palmer reports it from alluvial ground along roadsides, "probably introduced" in Saint Francis County, Arkansas. Pedersen says that it is "not rare on moist land" in Corrientes, Argentina. Rojas describes it as a shrubby herb 1—1.5 m. tall with blue-violet flowers, in fields and thickets at Puerto Casado, Paraguay, and Hassler comments that this material (T. Rojas 1892) is intermediate between V. bonariensis and V. inamoena Briq.

V. bonariensis is said to be adventive in England, according to Douglas H. Kent in a letter to me dated November 28, 1949. The J. Cryder specimen collected at Bradford, Yorkshire, in 1920 is also "probably this" according to Rep. Bot. Exch. Club Brit. Isles 1922: 617 (1923). Augusto cites Augusto, Bornmüller, Edésio, Emrich, Lindman, and Teodoro specimens from Rio Grande do Sul, Brazil; Hayek (1908) cites Wettstein & Schiffner s.n. and Campos Novaes s.n. from São Paulo. Schauer (1847 and 1851) cites Lhotsky s.n. from the Organ Mountains, Rio de Janeiro, as well as Bacle s.n., Ecklon & Zeyher s.n., and Lambert s.n. from the Cape of Good Hope; Pearson (1910) cites Drège s.n. [near Rondebosch], Rehmann 1704, and Woolley Dod 481 from the Cape. Guillaumin (1949) cites Buchholz 1491 and 1636 from New Caledonia. I have not as yet seen any of these specimens.

The specific name of this plant is sometimes upper-cased for no valid reason. The label on Franc 1018 says "Plants of New Caledonia", but "Loyalty Islands" has been added later.

The specimen on which the name Cymaria idjensis is based is apparently Koorders 43245 β in the Buitenzorg herbarium; that on which V. bonariensis f. umbrosa is based is Parodi 8890 from San Nicolás, Buenos Aires, collected in January, 1929, and deposited in the Osten Herbarium at Montevideo; and that on which V. littoralis H. Betch. is based is McCann s.n. [9-15-36] in the University of Maryland herbarium, the material on one sheet said to have been raised from seed obtained from Brussels and the other from seed received from Bucharest.

The "Index Kewensis", volume 2, page 1178, says for Verbena capensis Thunb., Prodr. Fl. Cap. 96. 1800 "bonariensis, Lippia asperifolia." On the basis of this statement, the name V. capensis is often given in the synonymy of V. bonariensis. Thunberg's description, however, is "capensis. V. diandra spicis oblongis solitariis axillaribus hirsutis, foliis ovatis rugosis crenatis." I think that this refers very plainly to Lippia javanica (Burm. f.) Spreng. and nothing else. It should not be in the synonymy

of Verbena bonariensis! as done by Walpers, Schauer, and Jackson.

The Verbena bonariensis Rendle is Junellia patagonica (Speg.) Moldenke, while V. bonariensis Schau. is V. intermedia Gill. & Hook.; V. bonariensis β littoralis Hook. of Walpers and var. littoralis Hook. of Gay are both V. litoralis H.B.K.

It should be noted here that the two very ancient specimens in the Stockholm herbarium, cited below, are inscribed with interesting annotations. The Nietzel s.n. has in pencil on the obverse side "cfr. Verb. 9 bonariensis L. sp. pl. 20", while on the reverse side, in pencil "linné herb." and in ink (in Montin's handwriting) "Verbena (bonariensis) tetrandra, spicis fasciculatis, foliis lanceolatis amplexicaulibus. Syst. nat. ed. 13. n. 10. Habitat in agro Bonariensi. ♃ Specimen ex horto Upsal. communicavit hortul Nietzel." The other, cited below as Herb. Linnaeus s.n., has on its obverse side, in pencil "cfr. Verbena 9 bonariensis L. sp. pl. 20 (Diandr. Monog.) K", and on the reverse side, in pencil "Linné herb." and in ink (in what is probably Linnaeus' handwriting) "Hort."; then in ink in an unknown hand "Verbena", then in ink in Linnaeus' hand "bonariensis", followed, in ink, in an unknown hand "Linn."

The original place of publication of the binomial is inaccurately given as page "28" in Lilloa 6: 322 (1941), as well as by Schauer (1847 and 1851) and other writers, while Moench (1802) gives the page as "117", also erroneously.

The physico-chemical properties of the sap in relation to phytogeography are discussed by Harris in the 1934 reference cited above, on the basis of a Jamaican specimen. The plant is used in popular medicine in Argentina according to Schwindt. Rosengurtt B.783 in the Britton Herbarium has galled spikes. The Torrey, Golub, & Moseley s.n. specimen in the University of Massachusetts herbarium, and Hatschbach 4215 in the University of Oklahoma herbarium, greatly resemble var. conglomerata Briq. and may possibly be better referred to that variety, while the Mrs. A. F. Nelson s.n. [5-5-42] at the University of Texas looks somewhat like V. brasiliensis Vell., but there are no good leaves left on the specimen to verify this suspicion. Worth & Morrison 16498 at the University of California is a mixture of V. bonariensis and V. brasiliensis.

The surname of Pedro Boffa, collector in Argentina, is misspelled "Boffo" in some herbaria.

Common names for V. bonariensis include "Bonar's verbena" [in North Carolina, according to Schallert], "camaradinha", "cambará do capuêra" [in Brazil, according to Stellfeld], "clustered-flowered vervain", "cluster-flowered vervain", "formosa sem dote", "hana-hrass" [in Hawaii, according to St. John & Hosaka], "hoi" [in Hawaii, according to William Brigham], "jurupeba", "margarita azul", "oi" [in Hawaii, according to St. John & Hosaka], "purple top" [in Queensland, according to Bailey], "sekara" [in Fiji, according to Parham], "South American vervain", "südamerikanisches

Eisenkraut", "tall verbena", "verbena", "verveine", "verveine de Buénos-Ayres", "verveine de Buenosaires", "verveine sauvage", "vunikutu" [in Fiji, according to Parham], and "yerba de fierro". It should be noted, however, that the name "verbena" is also applied to the genus Verbena as a whole, as well as to V. bracteata Lag. & Rodr., V. corymbosa Ruíz & Pav., V. hastata L., xV. hybrida Voss, V. litoralis H.B.K., V. officinalis L., V. peruviana (L.) Britton, V. platensis Spreng., V. stricta Vent., and V. urticifolia L., and even to Bouchea prismatica (L.) Kuntze, B. prismatica var. longirostra Grenz., Clerodendrum fragrans var. pleniflorum Schau., Priva lappulacea (L.) Pers., Stachytarpheta calderonii Moldenke, S. cayennensis (L. C. Rich.) Vahl, S. frantzii Polak., S. guatemalensis Moldenke, and S. jamaicensis (L.) Vahl. "Verveine" is applied also to Stachytarpheta cayennensis and S. jamaicensis, and "verveine sauvage" to Phyla nodiflora (L.) Greene.

Herbarium material of V. bonariensis has been misidentified and distributed as V. bonariensis f. longibracteata Kuntze, var. brevibracteata Kuntze, var. longibracteata Kuntze, V. brasiliensis Vell., V. braziliensis Vell., V. capensis Thunb., V. hanseni Greene, V. hastata L., V. hispida Ruíz & Pav., V. intercedens Briq., V. litoralis H.B.K., V. littoralis H.B.K., V. paniculata Lam., V. polystachya H.B.K., V. stricta Vent., V. urticifolia L., V. venosa Gill. & Hook., Lavandula burmannii Benth., Stachytarpheta sp., and "Labiatae". On the other hand, the Woolston 785 distributed as V. bonariensis is actually xV. intercedens Briq.; Kaspiew s.n. [Moss Vale, 4.6.51] and J. M. Wood 12122 are V. litoralis H.B.K.; Barkeley 231 is V. sphaerocarpa Perry; Duss 3470 and 4697 are V. rigida Spreng.; and Fox & Godfrey 2823 is V. brasiliensis Vell.

Dr. Bailey's manuscript Catalogue of Florists Handling Verbenaceae (1935) lists Reuthe as offering V. bonariensis to the horticultural trade.

In California the species has been collected at altitudes of 50 to 200 feet, in Arkansas from 145 to 250 feet, in Assam from 1000 to 3000 feet, in Jamaica from 3200 to 4000 feet, in Transvaal at 4350 feet, in Ceylon at 5000 feet, in Brazil at sea-level, in Argentina from 50 to 2900 meters, in Chile at 200 meters, and in Bolivia at 2200 meters.

Pellett (1923) reports that V. bonariensis "appears to be most important in many places as a source of honey. He says that "apparently it was first noticed in this country [the U.S.A.] in Mobile County, Alabama, in July 1893 and since that time has become common along roadsides and in waste places near the Gulf Coast much to the advantage of the beekeepers. The honey is dark in color with pronounced though pleasing flavor. In a letter to the author George W. Bohne of Luling, Louisiana, wrote as follows:

'This is a honey which often gives trouble to inexperienced operators as it is often gassy -- not actually fermented -- when freshly gathered we find large patches blown loose from the comb which form "white blisters" and show frothy bubbles within the cells. When put into storage tanks such honey granulates very quickly. Moderate heating before storage overcomes this condition. I figure that vervain honey amounts to about forty percent of our total yield.'"

The name, Verbena quadrangularis, was published on page 16 of the original Velloso work cited above, but appears on page 17 of the 1881 reprint published by the Arquivos Mus. Nac. at Rio de Janeiro. Sampaio & Peckolt (1943) and Irmão Augusto (1946) correctly reduced V. quadrangularis to synonymy under V. bonariensis, as Schauer (1847 and 1851) does also.

Hauman-Merck (1913) cites his no. 351 and Spegazzini 449 from Río Negro, Argentina, but I have not as yet seen these collections. Miss Perry cites 30 additional specimens not as yet examined by me: SOUTH CAROLINA: Charleston Co.: Curtiss 1963, in part (E, F, G); Gibbes s.n. [Charleston Neck, 28 Sept. 1853] (W); H. N. Moldenke 148 (E); Robinson 127 (G). ARKANSAS: Saint Francis Co.: E. J. Palmer 29303 (E, G). LOUISIANA: Saint Tammany Par.: Arsène 11859 (F, W), 12534 (F, W). TEXAS: Angelina Co.: Tharp 2558 (W): BERMUDA: Brown & Britton 98 (D, G); F. S. Collins 53 (G), 266 (G); Harshberger s.n. [Pembroke Swamp, 6/21/05] (D, E, G); Marble 737 (D); A. H. Moore 2946 (G); Robinson 94 (G). JAMAICA: A. S. Hitchcock s.n. [Blue Mountains, 14 Jan. 1890] (E); Maxon & Killip 569 (G); Nichols 163 (E, G); Orcutt 2736 (E, G); Perkins 102 (G).

In all, 749 herbarium specimens, including the types of most of the names involved, and 12 mounted photographs have been examined by me.

Citations: MASSACHUSETTS: Middlesex Co.: Pease 11837 (Ur). NEW JERSEY: County undetermined: I. Burk s.n. [Raign's Point, Oct. 1886] (Up--17109). NORTH CAROLINA: Bladen Co.: Fox & Boyce 3783 (N). Carteret Co.: M. Hill 165 (H—72611). Currituck Co.: W. B. Fox 4161 (N); W. H. Rhoades s.n. [Pemberton, August 1932] (Bt—30405, Bt--71466). New Hanover Co.: Fox & Boyce 3771 (N); Wells & Shunk s.n. [4/29/1938] (No--8595). SOUTH CAROLINA: Abbeville Co.: Radford 22769 (St). Charleston Co.: Curtiss 1963** (Bc, Cm, I, Pa, Vt); W. H. Duncan 6051 (Gu); Gibbes s.n. [Sept. 28, 1853] (N); Herb. Leroy s.n. [Charleston] (N); Mellichamp s.n. [1879] (Pa); H. N. Moldenke 148 (Go, H--5460, N, S, Up, Ur); F. H. Sargent s. n. [Charleston, June 26, 1950] (Ok, We); P. O. Schallert 1634 (H—5458). Georgetown Co.: Godfrey & Tryon 268 (Ca--956862, N). Sullivan Island: Biltmore Herb. 9386a (S). County undetermined: Herb. Leroy s.n. [S. C.] (C). GEORGIA: Calhoun Co.: R. F. Thorne 3659 (Vi), 4152 (N). Chatham Co.: W. H. Rhoades s.n. [Savannah,

August 1929; Moldenke 17082] (Br, Bt--71467, Bt, N, St). Grady Co.: Cronquist 5472 (Gu--29318). Richmond Co.: Cuthbert 267 (N), 358 (N), s.n. [June 22, 1900] (Fl--21071), s.n. [June 25, 1900] (Fl--21069). FLORIDA: Bradford Co.: Arnold & West s.n. [Starke, 6-15-30] (Fl--21073, Hp, Tl). Dade Co.: Esselbaugh s.n. [Princeton, March 16, 1946] (Ur). Gadsden Co.: Buswell s.n. [West Florida, May 1928] (Bu); E. West s.n. [Chattahoochee, 8 Sept. 1931] (Fl--21082). Polk Co.: McFarlin 5732 (Gg--237855, I, Mi). Walton Co.: E. G. Hume s.n. [Northwest Walton Co., 4/13/38] (Fl--29765). ALABAMA: Crenshaw Co.: C. T. Reed 2073 (Au). Tuscaloosa Co.: R. M. Harper 3672 (Ba, Mi, N). MISSISSIPPI: Harrison Co.: Bomhard s. n. [Gulfport, May 15, 1927] (Cm); H. P. Riley s.n. [May 8, 1937] (Rs--30539). Rankin Co.: W. H. Rhoades s.n. [Pelahatchie, July 1926] (Bt--71464, Bt--71465), s.n. [Pelahatchie, July 1927; H. N. Moldenke 17083] (Br, Bt--71465, Bt, Ml, N, Nd, Se, St). TENNESSEE: Haywood Co.: Herb. Butler Univ. 71468 (Bt); W. H. Rhoades s.n. [Brownsville] (Hs). ARKANSAS: Ashley Co.: Demaree 17637 (Du--256561, N, Ok), 23692 (Sm), 24516 (Bm, Sm). Bradley Co.: Demaree 19552 (Ca--882585, N). Drew Co.: Demaree 18555 (N, Ok), 19287 (Ky, N, Pl--131511, Ur), 23251 (Sm). Logan Co.: Mrs. H. S. Young s.n. [June 20, 1925] (Cm, Cm). Saint Francis Co.: E. J. Palmer 29303 (N). Sevier Co.: Brinkley 267 (Au); V. L. Cory 57455 (St). LOUISIANA: East Baton Rouge Par.: L. H. Bailey s.n. [Baton Rouge, July 16, 1918] (Ba); I. T. Forbes s.n. [Baton Rouge, Aug. 1927] (Io--128004). Jefferson Par.: L. E. Fox 2107 (Nc). La Fourche Par.: L. E. Fox 2030 (Nc). Plaquemines Par.: Ewan 17474 (Tl). Saint Martin Par.: S. W. Hutchinson 7878, in part (En). Saint Tammany Par.: George & Shepard 5 (Au). Tangipahoa Par.: Correll & Correll 9259 (H--78633, N). Terrebonne Par.: Arceneaux 35 (It); Small & Alexander s.n. [along Bayou Blue, near Houma, Apr. 1931] (H--82340, N, N, N). OKLAHOMA: McCurtain Co.: Estes 94 (St--17574); E. J. Palmer 10486 (Bi, Du--205611, S, W--1569482); Waterfall 7599 (Ok, St), 11160 (St). TEXAS: Angelina Co.: Tharp s. n. [Huntington, 9-15-1923] (Au). Galveston Co.: Mrs. A. F. Nelson s.n. [5-5-42] (Au). Hardin Co.: Tharp 50-108 (Au--121750). Harris Co.: Boon 60 (Au); G. L. Fisher 34094 (Au), s.n. [June 1, 1934] (St). Jasper Co.: Cory 49850 (Sm). Jefferson Co.: Brenckle 48071 (N); Warner s.n. [near Beaumont] (Hu). Liberty Co.: Stougaard s. n. [White Oak Bayou, August 20th, 1923] (Hu). Orange Co.: G. L. Fisher 48132 (No--24729). Red River Co.: E. Adams 27 (Nt, Nt). Tyler Co.: C. C. Albers 39011 (Au); Tharp s.n. [7/24/39] (Au, Au, Au, Ca--882584, Mi, N). Wood Co.: McMullen s.n. [Golden, 7/9/27] (Au). County undetermined: McMullen s.n. [9-10-27] (Nt). OREGON: Multnomah Co.: L. F. Henderson 1525 (Or--8851). CALIFORNIA: Butte

Co.: J. T. Howell 34674 (Gg). Fresno Co.: Ella Carter 91 (Ca--709369, N). Marin Co.: J. T. Howell 19323 (Au, Ca--710620, Gg--322695, N, Pl--152029, S); Stacey s.n. [Oct. 27, 1924] (Gg--34493). Merced Co.: Crampton 2262 (Gg--389574, Gg--389575); J. T. Howell 1081 (Gg--172420); Mason & Smith 8242 (Ca--192056, Du--415523). Solano Co.: C. E. Smith 2 (Gg--31465). Stanislaus Co.: Nobs & Smith 206 (Ca--192058, Du--415587). Yuba Co.: Carter & Bowerman 3721 (Ca--623487, Du--269449, Gg--310896); Hainey s.n. [Marysville, 7/2/1920] (Gg--186167); A. A. Heller 15162 (Ca--726652, Du--256716, N, Po--252838, S, Se--86612, Ur, Ur); B. R. Jackson s.n. [Marysville, June 1932] (Gg--195408, Mn--20597); Jepson 16759 (Ca); L. S. Rose 39200 (N, We); C. B. Wolf 1965 [5503] (Mn--23987); Wolf & Stark 5503 [seed 1965] (Ca--527328, Du--231446, Gg--218383, Po--213074, Rs--7608). BERMUDA ISLANDS: Main: Bailey, Bailey, Whetzel, Degener, & McCallan s.n. [July 25, 1921] (I); Brown & Britton 98 (N, Po--63881, Up--45675); F. S. Collins 266 (Cm, N); O. Degener 1302 (N), s.n. [Hungry Bay, July 25, 1921] (Ba, Ms); Harshberger s.n. [Pembroke Swamp, 6/21/05] (N, Up--39539); Marble 737 (N); McCallan s.n. [Experiment Station, July 4, 1921] (Ba); A. H. Moore 2946 (Gg--155396, Mi). Saint George's: W. R. Taylor 49-1151 (Mi). JAMAICA: Barkley & Rishbeth 1121 (Le); N. L. Britton 1700 (N), 3313 (N); Chrysler 1419 (Ru); B. M. Davis s.n. [Abbey Green] (Mi), s.n. [Rodvor] (Mi); W. Harris 9132 (N); Harris & Lawrence C.15120 (Ca--987505); Maxon 2615 (N); Maxon & Killip 569 (N, Ur); Nichols 163 (N); C. R. Orcutt 2736 (Ca--430611, Po--179460, S), 3338 (Ca--430596); Proctor & Barkley 22J282 (Cb); Rothrock 340 (Up--33297); N. Taylor 4244 (N). COLOMBIA: Magdalena: Barkley & Gutiérrez Villegas 1927 (N). ECUADOR: Pichincha: Paredes s.n. [Sept. 1943] (N). PERU: Department undetermined: Née 12, in part (Q). BRAZIL: Federal District: Azambuja 38 (N); Freire & Vidal s.n. [Quinta da Boa Vista, Jan. 1923] (Ja--46523); Occhioni 532 [Herb. Jard. Bot. Rio Jan. 55229] (N). Minas Gerais: Bello 176 (Ja--46592); F. C. Hoehne s.n. [Poco de Caldas, Jan. 26, 1919] (Sp--2912); Lindberg 135 (Br, S); Mello Barreto 3179 [Herb. Jard. Bot. Belo Horiz. 2278] (Ja--46554); Mosén 640 (N, S); Regnell II.205 [12/1864] (S), II.205 [1/1865] (S), II.205b (S), II.210 [8/1/1857] (S, Ug); Widgren 1208 (Br), s.n. [1845] (Ja--46589, Lu, S). Paraná: Dusén 17044 (S), s.n. (Ja--46572); Hatschbach 4215 (Ok), 4307 (Sm), 5418 (Mm). Rio de Janeiro: N. J. Andersson s.n. [Rio de Janeiro, 1851] (N, S, S); Bailey & Bailey 297 (Ba); Bello 175 (Ja--46591); Emygdio de Mello Filho s.n. (Ja--46553); Herb. Saldanha 6089 (Ja--46539), 6939 (Ja--46540); Rocha & Silva 13 (Ja), 53 (Ja); Sampaio 7687 (Ja--46516), 8505 (Ja--34734); J. Vidal II.

5045 (Ca--170005), s.n. [Maricá, April 20--25, 1943] (Ja--38972); Vidal & Valle I.69 (Ja--46779); Vieillard s.n. [Rio Janeiro, 1861] (La). Rio Grande do Sul: Costa Sacco 410 [Herb. Hort. Bot. 1316] (N); Henz s.n. [Rambo 35458] (N); Jürgens 27 (B), 290 (B); Rambo 51444 (N), 57305 (S); Vianna 123 [Herb. Jard. Bot. Rio Jan. 46114] (N). Santa Catarina: Hatschbach 526 (N, Ug); Reitz 3321 (N, S, S); Smith & Klein 11183 (W--2249375), 11394 (N, Ok); Smith, Reitz, & Sufridini 9426 (Ok), 9430 (W--2249360), 9545 (Ok). São Paulo: Bailey & Bailey 860 (Ba); Freire & Azevedo 131 (Ja--31561); F. C. Hoehne s.n. (N, Sp--1361, Ug); W. Hoehne 887 (N); Moldenke & Moldenke 19669 (Es, Lg, N); Usteri s.n. [Santos, Jan. 20, 1907; Herb. Polytech. São Paulo 254b] (Sp--15724); J. Vidal s.n. [Ribeurão Pires, April 1937] (Ja--35198). State undetermined: Lisbôa s.n. [Herb. Jard. Bot. Rio Jan. 2688] (N); Mikan s.n. [Tocaja, Martio] (V); Widgren s.n. [Brasilia] (Lu). URUGUAY: "A. C." s.n. [Herb. Osten 21879] (Ug, Ug); Arechavaleta 36 (N, Ug); H. H. Bartlett 20710 (Mi), 21292 (Mi, W--1907582), 21306 (Ca--775172, Mi, W--1907583); Berro 2922 (N), 6717 (N), 8408 (N); Cabrera 3223 [Herb. Osten 23346] (N, Ug); Caldevilla 85 (Ug--5990); Castellanos s.n. [Herb. Inst. Miguel Lillo 11758] (N); Collector undesignated 50 (Ug); Gallinal, Aragone, Bergalli, Campal, & Rosengurtt PE.4733e (N); Gardia s.n. [Lab. Biol. Animal, Jan. 12, 1943] (Ug); Herter 268 [Herb. Herter 81709] (B, B, Ca--314285, N, S, Sp--26635), s.n. [Herb. Osten 18496] (Ug), s.n. [Herb. Osten 19030] (Ug); Legrand 100 (Ug), 398 (Ug); Osten 4666 (Ug); Rosa-Mato 1916 (Ug--9815); Rosengurtt B.783 (N), B.864 (N); Seijo s.n. [16 Nov. de 1884] (Ug); Teissene 4480 (Ug). PARAGUAY: Hassler 2130 (Cb, V--1406), 6692 (Ca--944358, N, S), 9643 (Cb, N, V); Jörgensen 3768 (Du--197904); Lindman A.3645 (N, S); T. Meyer 16033 (N); Montes 3334 (N); Morong 173 (C), 1540 (C); Pedersen 4341 (N); T. Rojas 172 (S), 1892 [Herb. Hort. Parag. 10077; Herb. Osten 13559] (Ug), 13559 (Go). BOLIVIA: Cochabamba: Steinbach 5020 [Herb. Osten 16232] (Cb, N, Ug), 9681 (E--974664, N, Po--219681, S). CHILE: Concepcion: Barros Valenzuela 8044 (N); Capt. King s.n. [Concepcion] (S). Coquimbo: Worth & Morrison 16498, in part (Ca--631730). O'Higgins: Sparre 2297 (S). Santiago: Guzmán 23 [Herb. Mus. Nac. Hist. Nat. Chile 59935] (N); Pahlman s.n. [Las Nogales, Jan. 28, 1913] (S). Valdivia: Buchtien s.n. [7/11/1902] (S), s.n. [Valdivia, 17.I.1904] (Gg--353140); Hollermayer 64 (Ca--704783), s.n. [Werdermann 1362] (Ca--323093, S); Lechler 185 (S); R. A. Philippi 115 (S). Province undetermined: Cuming 352 (Br); Herb. Esc. Agric. El Vergel 178 [Angol] (Ca--664808); Kunkel s.n. (Cb). ARGENTINA: Buenos

Aires: R. Alvarez 221 (S), 350 (S), 759 (Ca); N. J. Andersson s. n. [Buenos Ayres, 1852] (S); Boffa s.n. [Berisso, 20-II-1945] (Gg--406036, S), s.n. [Berisso, XII.1944] (S); Brizuela 1459 (Vi), 1589 (Vi); Cabrera 1367 (N), 1689 (N, S), 4288 (N), 4784 (N), 5148 (N), 5233 (N), 5660 (N), 10696 (Vi); G. Dawson 912 (Ca--882587, N); Eyerdam & Beetle 23173 (Ca--636607); Gillies s.n. [Pampas of Buenos Ayres] (N--photo, Z--photo); Herb. Linnaeus G. 37, S.11 (Ls--type, N--photo of type, Z--photo of type); Hicken s.n. [Herb. Inst. Bot. Darwinion 8760] (N); Krapovickas 3412 (N); Lefebre s.n. [1885] (Br); Malecky s.n. [Enero 1940] (Ca--882586); Moldenke & Moldenke 19709 (N); Née 12, in part (Q), 86 (Q); Osten 2604 (Ug); Parodi 8890 [Herb. Osten 20943] (Ug); Remiro s.n. [15. X.1945] (Vi); Ruiz Huidobro 1666 (S), 1695 (N, S), 1771 (S); Scala 372 (N, N, Ug), s.n. [Canal Guazú, XI/1925] (N); A. G. Schulz 5678 (Sz); Venturi 54 [Herb. Inst. Miguel Lillo 31447] (N, N, S), 149 [Herb. Inst. Miguel Lillo 31446] (N). Catamarca: Jörgensen 1295 (W--1121004). Chaco: R. M. Aguilar 467 (N), 803, in part (N); Buratovich 732 (N); Jörgensen 2468 [Herb. Osten 11875] (Ug); T. Meyer 3444 [Herb. Inst. Miguel Lillo 17333] (Ca--882873, N); A. G. Schulz 1483 (N); C. L. Schulz 807 (Gg--353258, N), 1131 (N). Córdoba: Balegno 937 (N); Birabén 31 (N); A. T. Hunziker 8116 (N); Rodrigo 309 (N); F. A. Roig 1071 [Herb. Ruiz Leal 17829] (Sm). Corrientes: Collector undesignated 3971 (N); Ibarrola 1241 (S), 2131 (W--1931874); Pedersen 1333 (N); Rodrigo 708 (N, N); Ruiz Huidobro 3733 (N), 3798 (N), 3873 (N), 3987 (N), 4066 (N), 4125 (N), 4175 (Es, N); Rosengurtt B.3707 (N); G. J. Schwarz 325 (S), 360 (S). Entre Ríos: Job 90 (W--1987981); T. Meyer 10758 (N); Ruiz Huidobro 3592 (Es, N), 3657 (Es, N); Scala s.n. [Canal Guazú] (N); Sota 63 (N). Formosa: I. Morel 41 (N), 159 (N), 323 (N), 372 (Gg--352697, N), 609 (N), 627 (N), 757 (N), 1221 (N). Mendoza: Araque Molina & Barkley 20M2217 (N); Carette & Ruiz Leal 3891 (N); Paci 794 (N); Ruiz Leal 1046 (N), 3055 (N). Misiones: Bertoni 2436 (N); Ekman 1972 (N, S), 2025 (S), 2026 (N, S), 2027 (N), 2028 (N); G. J. Schwarz 1427 (N), 1723 (N), 3490 (N), 3582 (N); Schwindt 37 (N). Río Negro: W. Fischer 236 (Cm, N, Ur). Salta: Bruch s.n. [Las Juntas, XII/1896] (N, N); Burkart 13205 (N); Ruiz Leal 12626 (Ss). San Juan: Cuezzo 1077 (N, Ok). San Luis: Vignati s.n. [Estancia Grande, II-1940] (N). Santa Fé: R. Alvarez 346 (N); Barrionuevo s.n. [4-II-47] (N); Greco s.n. [4-II-1947] (N); Hayward 1425 (N); Job 634 (N), 796 (N, S), 797 (N), 1063 (N); Maldonado Bruzzone 1723 (W--1988281); Terribile 464 (N), 512 (N); Venturi 84 [Herb. Inst. Miguel Lillo 31449] (N). Tucumán: Bruch 2723 (N, N, S, Sp--36994, Sp, Ug);

Castillón s.n. [Herb. Inst. Miguel Lillo 31444] (Au, N); Descole & Schreiter 10752 (Ca); Lillo 11326 [Herb. Osten 8462] (Ug), s.n. [Herb. Inst. Miguel Lillo 31451] (N, N); Lorentz & Hieronymus 853 (N), s.n. [30.I.1874] (Br); Monetti 239 [Herb. Osten 10873] (Ug); Olea 134 (Ca--165477); C. C. Olrog s.n. [P. Olrog 90] (Og), s.n. [P. Olrog 92] (Og); D. Rodriguez 471 [Herb. Inst. Miguel Lillo 31450] (Au, N, Vi); Schreiter s.n. [Gualinchay, Dec. 1, 1917; Herb. Osten 12194] (Ug); Venturi 2937 [Herb. Osten 17240] (Ug). Province undetermined: Hicken 889 (Gg--31286); Hunziker 911 (N); Sparre 388 [Rosario] (S). ST. HELENA: N. J. Andersson s.n. [St. Helena] (S). MADEIRA: G. Gonçalves da Costa s.n. [Maio 1938] (Go). CANARY ISLANDS: Tenerife: Asplund 693 (S); Bourgeau s.n. [Teneriffa; Herb. Saldanha 2772; Herb. Mus. Nac. Rio Jan. ref. II] (Du--166456, Ja); Cyrén s.n. [9 Juin 1929] (Ca--17491, Go, Go); Eliasson s.n. [Realejo Alto, 2/8/1957] (Go); Tullgren 192 (S). Island undesignated: Burchard 124 (S). SWEDEN: Blom s.n. [in ruderatis, 4/9/1939] (S), s.n. [Göteborg, 4/9/1939] (Go), s.n. [Göteborg, 6/10/1940] (Go). PORTUGAL: Gomes Pedro s.n. [Pragal, Almada] (N). SPAIN: Herb. Mus. Bot. Stockh. 51 (S). GERMANY: Fiedler 26633 (Go). SWITZERLAND: Probst s.n. [8.9.27] (Go), s.n. [23.8.32] (Pb), s.n. [27.8.32] (Pb), s.n. [17.8.1936] (Ew, Gg--267611), s.n. [Solothurn, 11.11.1936] (N). CONGO LEOPOLDVILLE: Bredo 1072 (Br); Quarré 74 (Br, Br, Br), 3224 (Br, Br, Br), 3468 (Br, Br, Br), 4759 (Br, Br, Br). KENYA: Lindblom s.n. [5.1920] (S). SOUTHERN RHODESIA: J. C. F. Hopkins s.n. [Govt. Herb. Salisbury 6744] (N), s.n. [Govt. Herb. Salisbury 7911] (N), s.n. [Govt. Herb. Salisbury 9405] (Rh); G. M. McGregor M.82/37 (S); Pardy s.n. [Govt. Herb. Salisbury 8488] (N); Rattray 1007 (Rh). REPUBLIC OF SOUTH AFRICA: Cape Province: N. J. Andersson s.n. [Cap] (S, S); Drège s.n. [Tygerberg] (S); Gröndahl s.n. [Prom. b. spei] (S); Haptröm s.n. [3 Jan. 1935] (S); Herb. Mus. Bot. Stockholm s.n. [Rondebosch] (S); Rehmann 1709 (Br); Sidey 3053 (S); Sollier s.n. (S); Stender s.n. [Cap] (S); Thunberg s.n. (S); Wahlberg s.n. [Africa occidentalis] (S), s.n. [Kaapsche Flahte] (S); E. Wall 5, in part [Heidelberg, 8/36] (Ew), 5, in part [Swellendam, 10/12/37] (Ew). Natal: A. P. D. McClean 851 (Gg--310862); Sidey 2058 (S), 3443 (N, S); O. West 975 (Ss); Wylie 27993 (N). Transvaal: Bodley s.n. [Jan. 1923] (S); L. E. Codd 5689 (Ss); T. J. Jenkins s.n. [Herb. Transvaal Mus. 10275] (Z); A. Peter 50921 [S.40] (B), 50947 [S.41] (B); Repton 304a (Ba, Se--95334); F. A. Rogers 18871 (S); Schlieben 7176 (B, N); R. G. N. Young s.n. (Cb). State undetermined: Acock 4326 [Hels Hoogte] (S); Penther 1795 [Swellendam, Heidelberg] (S); F. R. R.

Schlechter 2334 [George] (S). MALGACHE REPUBLIC: d'Alleizette 74m (P); Baron 1715 (P), 2363 (K), 2715 (K), 6104 (P); Geneaud 7 (P). MASCARENE ISLANDS: Mauritius: N. J. Andersson s.n. [Mauritius] (N, S); Bijoux s.n. (Bz--23741); Sieber, Fl. Maurit. II.214 (Br, M, P); d'Urville s.n. [Ile de France, 1825] (P); Vaughan 118 (S). REUNION: Boivan 1236 (Du--166455); Potier s.n. [St. Denis, Sept. 25, 1872] (P); Richard 95 (P). INDIA: Assam: W. Griffith s.n. [1843] (Br). East Punjab: Koelz 4571 (Mi, N); Ram 312 (N); R. R. Stewart 1866 (N). Khasi States: Hooker f. & Thomson s.n. [Mont. Khasia] (Br, M, S). Uttar Pradesh: R. R. Stewart 16007 (N). State undetermined: Herb. Roxburgh s.n. (Br). CEYLON: Silva 48 (N). MALAYA: Pahang: Burkill 808 (Ng--16860). INDONESIA: GREATER SUNDA ISLANDS: Java: C. A. Backer 25103 (Bz--23726, Bz--23727, Bz--25645, Ut--52561); Bergman s.n. [VII.1939] (Bz--23730); Clason-Laarman 636 (Bz--23732); Docters van Leeuwen-Reijnvaan 4595 (Bz--23728); C. W. Franck 545 (S); Groenhart s.n. [5/3/1939] (Bz--23729); Koorders 43221 (Bz--23737, Bz--23738), 43245β (Bz--23736, Bz--25646); Ultée s.n. [IX.1925] (Bz--23724, Bz--23725, Ut--81991); Van der Gijl 139 (Bz--23733); Van Steenis 7194 (Bz--23731). MELANESIA: New Guinea: Northeastern New Guinea: M. S. Clemens 8255a (B), 8610 (B), 8668a (B). LOYALTY ISLANDS: Franc 1018 (Ca--390583, N). NEW CALEDONIAN ISLANDS: New Caledonia: Franc 1693a (N, N); Germain s.n. [1874--76] (B); MacDaniels 2044 (Ca--54060). YASAWA FIJI ISLANDS: Viti Levu: Meebold s.n. [Suva, Aug. 1932] (Bi). AUSTRALIAN REGION: AUSTRALIA: New South Wales: Collector undesignated 770 (B); Kaspiew 1470 (B); Rodway 332 (Gg--226488); Valentin s.n. [29 Jan. 1948] (S). Queensland: M. S. Clemens s.n. [Double Island Point, October 1946] (Mi); Mauritzon s.n. [near Cairns, December 1936] (Go); L. S. Smith 3076 (N); C. T. White 7222 (Ba). South Australia: Kaspiew 99 (Ew), 1469 (B). State undetermined: Kuntze 20183 [Stanthorpe] (N). GREAT BARRIER REEF: Bribie Island: M. K. Clemens s.n. [Apr. 20--30, 1944] (Or--49589). Double Island: M. K. Clemens s.n. [Feb. 16, '43] (Or--46677), s.n. [Oct. 1947] (Or--56195). NEW ZEALAND: Philson 234 (H--56451). POLYNESIA: HAWAIIAN ISLANDS: Lanai: G. C. Munro 326 (Bi), 352 (Bi), 444 (Bi), s.n. [Kamoku, 6/29/18] (Bi). Molokai: O. Degener 11260 (N, N). PITCAIRN ISLAND: Chapin 947 (Bi, N), 948 (N); Quayle X (Bi, Bi); H. Saint John 14993 (Bi). CULTIVATED: Belgium: Herb. Du Mortier s.n. [Hort. Bot. Bon. 1825] (Br); M. Martens s.n. [hort. insul. 1820] (Br), s.n. (Br); Nyst s.n. (Br). British Guiana: L. H. Bailey s.n. [Botanic Garden, Georgetown] (Ba). Canada: G. H. M. Lawrence 753 (Ba). Canary Islands: E. Wall 5, in part [28/423] (Ew). Congo Leopoldville: RR. PP. Salèsiens

263 (Br), 638 (Br). England: L. H. Bailey s.n. [Royal Botanic Gardens, Kew, Aug. 8, 1919] (Ba); Herb. Roy. Hort. Soc. Garden Wisley s.n. [August 1937] (Ba); Nelmes 1044 (Ba). France: Bouchon 3889 (La), s.n. [Duffour 3889] (Vi); Collector undesignated 12 (Q), s.n. [h. P.] (Br); Herb. W. H. Harvey s.n. [h. R. P. 1819] (Du--166453), s.n. [h. P. 1820] (Du--166454), s.n. (Du--166452); Herb. Saldanha 2776 (Ja--46560). Germany: Herb. Calif. Acad. Sci. 31283 (Gg), 31284 (Gg). India: Herb. Hort. Bot. Calcutt. s.n. (Bz --23739, T); Wallich s.n. (S). Java: Herb. Hort. Bot. Bogor. XV. K.A.XLV.12 (Bz--26439), XV.K.A.XLVI.5 (Bz--26454). Maryland: Mc Cann s.n. [9-15-36] (Md, Md, Md). Massachusetts: L. H. Bailey s. n. [Harvard Univ. Bot. Gard.] (Ba); Torrey, Golub, & Moseley s.n. [Amherst, Sept. 18, 1939] (Ms). New Jersey: G. H. M. Lawrence P. 520 (Ba). New York: H. N. Moldenke 8551 (N). Oklahoma: Stratton 6124 (St). Peru: Soukup 2911 (N). Sweden: Herb. Linnaeus s.n. (F-photo, N--photo, S, Sg--photo, Z--photo); O. R. Holmberg s.n. [22/9/1911] (Lu); Nietzel s.n. (S); E. Wall 5, in part [1/941] (Ew). LOCALITY OF COLLECTION UNDESIGNATED: Collector undesignated 520 [Herb. Mus. Nac. Rio Jan. prov. IV] (Ja), s.n. (N); Gandoger s.n. [Can. Gomera, 4.1905] (N); Herb. Jard. Bot. Brux. s.n. (Br); Herb. Jewett s.n. (Mi, Mi); Herb. Linnaeus s.n. (F--photo, N--photo, S, Sg--photo, Z--photo); Herb. Martius s.n. (Br); Herb. Mus. Bot. Stockholm s.n. (S, S, S), s.n. [Feb. 22--24] (S); Herb. Mus. Nac. Rio Jan. ref. VIII (Ja), X (Ja); Herb. Petit-Thouars s. n. (P); V. May s.n. [French's Forest, 26/1/35] (Go); Osbeck s.n. (S); T. Shepherd 19 (S); Swartz s.n. (S).

VERBENA BONARIENSIS f. ALBIFLORA Moldenke, Phytologia 3: 117. 1949.

Literature: Moldenke, Phytologia 3: 117 & 135. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 197. 1949; Moldenke, Résumé 126 & 471. 1959.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by A. V. de la Sota (no. 82) on Isla "El Cavadito", dept. Gualeguay, Entre Ríos, Argentina, on January 13, 1947, and is deposited in the Britton Herbarium at the New York Botanical Garden. Thus far it is known only from the original collection. In all, 1 herbarium specimen and 4 mounted photographs have been examined.

Citations: ARGENTINA: Entre Ríos: Sota 82 (F--photo of type, N--type, N--photo of type, Sg--photo of type, Z--photo of type).

VERBENA BONARIENSIS var. CONGLOMERATA Briq., Arkiv Bot. Stockh. 2 (10): 11, pl. 3b. 1904.

Literature: Briq., Ann. Conserv. & Jard. Bot. Genèv. 3: 164.

1899; Briq., Arkiv Bot. Stockh. 2 (10): 11, pl. 3b. 1904; Stapf, Ind. Lond. 6: 429. 1931; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 101. 1942; Moldenke, Castanea 13: 117 & 118. 1948; Moldenke, Alph. List Cit. 2: 458 & 599 (1948), 3: 665, 703, 704, 848, 858, & 869 (1949), and 4: 1124 & 1249. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 99, 100, 105, & 197. 1949; Moldenke, Phytologia 3: 135 (1949), 3: 305 (1950), and 3: 467. 1951; Stellfeld, Trib. Farmac. [Vellozoa] 19 (10): 166. 1951; Moldenke, Résumé 109, 118, 119, 126, 223, & 471. 1959; Moldenke, Résumé Suppl. 2: 2. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Moldenke, Résumé Suppl. 3: 8 & 29. 1962.

Illustrations: Briq., Arkiv Bot. Stockh. 2 (10): pl. 3b. 1904.

This variety differs from the typical form of the species in its very harshly rough bullate-rugose leaves, much reduced and more or less capitate or subcapitate spikes, and elongated well-developed corollas, twice as long as in the typical form, whose tube surpasses the calyx by 2—3 mm. and whose limb is to 3 mm. wide. The plant is described by collectors as an annual suffrutescent herb, 1—2 m. tall; the stems very rigid; leaves mostly 3—5 cm. long and 0.8—1.5 cm. wide; spikes very short, densely glomerate in quasi-heads at the apex of the peduncles; bractlets rather broadly lanceolate or ovate-lanceolate, acuminate at the apex, equaling or slightly surpassing the calyx; calyx red; corolla varying from blue or intensely violet-blue to lilac, lavender-purple, violet, blue-violet, or purple, or the limb Amethyst Violet No. 35/2 and the tube Rhodamine Purple No. 29/1, according to the Royal Horticultural Society Colour Chart, 1938—1942.

The type of this distinctive variety was collected by Carl Axel Magnus Lindman (no. A.473) in dry sandy pastures at Porto Alegre, Rio Grande do Sul, Brazil, on October 12, 1892, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques in Geneva. The variety is said by collectors to inhabit marshes and swampy places, wet fields and wet fertile meadows, shrubby fields and campos, river banks, high grassy rather wet soil along railroad embankments, and dry sandy pastures, blooming from September to April and in July. Jörgensen describes it as ruderal and common at Villa Rica, Paraguay; Osorio found it to be "rare in the interior of a swamp" at La Barra, San José, Uruguay. Ritter reports that where he found it in Rio Grande do Sul there is a 1.5 m. rainfall and 10—35° annual temperature. Goodspeed says that it is a "rather good garden prospect if grown in masses, cuts and keeps well." It was introduced into cultivation in 1841.

This plant has recently been found as a garden weed at Sebastopol, Sonoma County, California. Seeds from this material have been scattered near the museum buildings of the California Academy of Sciences in Golden Gate Park, San Francisco, and have produced tall stiffly erect plants which J. T. Howell, in a letter to me dated June 26, 1961, says were blooming in June, producing "a real show....delicately and pleasantly fragrant." My wife, son, and I saw these plants still in full bloom there in August, 1961, on our visit to the locality.

The variety is found native from southern Brazil through Uru-

guay and Paraguay into northern Argentina, at altitudes of 6 to 20 meters. Berro 1626 in the Britton Herbarium is apparently virus infected. Briquet, in his original description, points out that this variety has exserted well-developed corollas like those seen in V. rigida Spreng., but very unique capitate inflorescences. He says that the Reineck & Czermak 151 which he cited as V. bonariensis in his 1899 publication is really this variety, but I have not as yet seen this collection.

Specimens of the variety have been misidentified and distributed in herbaria as V. bonariensis L., V. bonariensis var. brevibracteata Kuntze, f. brevibracteata Kuntze, α brevibracteata Kuntze, var. longibracteata Kuntze, V. inamoena Briq., V. montevidensis Spreng., and V. rigida Spreng. The Hoss 18323 from Tennessee has a label reading "in the back yard of J. M. Brown, 1601 Lombard Place, probably a hybrid, June 29, 1954".

In all, 65 herbarium specimens, including the type collection, and 4 mounted photographs have been examined by me.

Citations: TENNESSEE: Knox Co.: Hoss 18323 (O). CALIFORNIA: Sonoma Co.: Noldeke s.n. [Sebastopol, May 14, 1961] (Z). BRAZIL: Paraná: Dusén 7166 (S). Rio Grande do Sul: Lindman A.473 (F--photo of isotype, N--photo of isotype, S--isotype, S--isotype, Si--photo of isotype, Z--photo of isotype); Malme 701 (S), 701a (S), 915 (S); Rambo 38407 (N), 41219 (N), 51444 (N, S); Reineck & Czermak 69 [Herb. Osten 4159] (S, Ug); Ritter 35458 (N, S). State undetermined: Widgren s.n. [Brasilia] (S). URUGUAY: Arechavaleta 463 (Ug, Ug, Ug); Banquero & Bronsini 3137 (Ug); H. H. Bartlett 21292 (Ca--772088); Berro 1626 (N), 1966 (N); Caldevilla 636 (Ug--9804); Gallinal, Aragone, Bergalli, Campal, & Rosengurtt PE.5461 (N); Herter 1059a [Herb. Herter 82626] (B), s.n. [Herb. Osten 18496] (Ug); Osorio 348 (Ug--13054); Osten 3662 (N, Ug), 4724 (Ug, Ug), 5391 (N, Ug, Ug); Rosengurtt & Gallinal 5804 (S, Ug--14300). PARAGUAY: Hassler 8934 (N, N, S); Jörgensen 3768 [Herb. Osten 22250] (N, N, S, Ug), 3774 [Herb. Osten 22240] (Ug); T. Rojas 1880 [Herb. Hort. Parag. 10067; Herb. Osten 13528] (N, Ug), s.n. [Herb. Osten 13528] (N, N, S). ARGENTINA: Buenos Aires: Dusén 6293 (S); Goodspeed 23225 (Ca--636601), Corrientes: Ibarrola 1784 (S), 1963 (S). Entre Ríos: T. Meyer 10313 (N). Misiones: Bertoni 1915 (N). CULTIVATED: Belgium: M. Martens s.n. [ex horto 1841] (Br), s.n. [ex horto 1843] (Br). California: Bracelin 1512 (Gg--339909, Go), 2827 (Gg--347738, Go). New York: New York Bot. Gard. Cult. Pl. 387-38 (N). North Dakota: Waldron s.n. [Stevens 756] (Ca--882807).

VERBENA BRACTEATA Lag. & Rodr., Anal. Cienc. Nat. 4: 260. 1801.

Synonymy: Verbena prostrata G. Savi, Soc. Ital. Mem. Mat. & Fis. 9: 349, pl. 7. 1802 [not V. prostrata Ait., 1947, nor Benth., 1959,

nor R. Br., 1812]. Verbena bracteosa Michx., Fl. Bor.-Am. 2: 13. 1803 [not V. bracteosa Pursh, 1940]. Verbena squarrosa Roth, Catalect. Bot. 3: 3. 1806. Zapania bracteosa (Michx.) Poir. in Lam., Encycl. Méth. Bot. 8: 843. 1808. Verbena repens Spreng. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841 [not V. repens Bertol., 1806, nor Larraft., 1959, nor Savi, 1825, nor Ten., 1947]. Zapania bracteosa Poir. apud Walp., Repert. 4: 24, in syn. 1845. Verbena canescens Chapm., Fl. South. U. S., ed. 1, 307. 1860 [not V. canescens H.B.K., 1818]. Verbena bracteosa var. brevibracteata A. Gray, Syn. Fl. N. Am. 2 (1): 336. 1878. Verbena rudis Greene, Pittonia 4: 152. 1900. Verbena confinis Greene, Pittonia 4: 152. 1900. Verbena brevibracteata (A. Gray) Eggert, Torreya 2: 124. 1902. Verbena imbricata Woot. & Standl., Contrib. U. S. Nat. Herb. 16: 166. 1913. Verbena bracteata Cav. ex Seymour, Host Ind. Fungi N. Am. 587. 1929. Verbena bracteata var. confinis (Greene) Farwell ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena bracteata var. rudis (Greene) Farwell ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena braceosa Michx. ex G. L. Fisher, Am. Bot. Exchange List, sphalm. 1946. Verbena bracteata Michx. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena bracteate Timmons ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena repens Thouin ex Moldenke, Résumé 373, in syn. 1959. Verbena stricta x bracteosa Engberg ex Moldenke, Résumé 375, in syn. 1959 [not V. stricta x bracteosa Bebb, 1940, nor Eggert, 1940, nor A. S. Hitchc., 1940, nor Mackenzie, 1940, nor Rydb., 1940, nor Sandberg, 1947]. Berbena bracteosa Michx. ex Moldenke, Résumé Suppl. 2: 8, in syn. 1960. Verbena bracteata (Lag.) Rodr. ex Moldenke, Résumé Suppl. 2: 10, in syn. 1960. Verbena bracteosa Gray ex Moldenke, Résumé Suppl. 2: 10, in syn. 1960. Verbena bracteosa stricta Thompson ex Moldenke, Résumé Suppl. 2: 10, in syn. 1960. Verbena braeteosa Michx. ex Moldenke, Résumé Suppl. 2: 10, in syn. 1960. Verbena canescens Kunth sensu Chapm. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960. Verbena imbricaria Woot. & Standl. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960. Verbena bractiata Lag. & Rodr. ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962. Verbena bracteata Lag. ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962. Verbena bracteosa Benth. ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962. Verbena bracteosa L. ex Moldenke, Résumé Suppl. 3: 36, in syn. 1962.

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Annual or perennial, hairy, commonly prostrate or trailing, sometimes forming large spreading mats or clumps to 1 m. in diamster from a single caudex, occasionally erect; root large, woody;

stems usually several from a common base, diffusely branched and wide-spreading, decumbent or ascending, rarely erect, hirsute or coarsely hirsute; branches usually decumbent or prostrate, 1—5 dm. long, hirsute; leaves 1--6.5 cm. long, wedge-lanceolate, pinnately incised or usually 3-lobed, narrowed at the base into the short margined petiole, hirsute on both surfaces, the midrib and larger veins slightly prominent beneath, the lateral lobes narrow and divaricate, the middle lobe large, cuneate-obovate, incised-dentate or cleft; spikes terminal, sessile, continuous with the branches or nearly so, comparatively thick (usually 10--15 mm. wide), conspicuously bracteose, harshly hispid-hirsute throughout; bractlets large, conspicuous, much longer than the calyx, foliaceous, usually surpassing the entire flower, mostly 8—15 mm. long, acute to acuminate or short-attenuate at the apex, spreading-ascending or sometimes appressed, recurved in age, coarsely hirsute, the lowermost often incised and quite leaf-like, the upper linear-lanceolate, entire; flowers small, 4--10 mm. long; calyx 3--4 mm. long, hirsute particularly along the veins, its lobes very short, connivent over the schizocarp; corolla varying from blue, bluish, light-blue, light lavender-blue, bluish-purple, or deep-blue to purplish, purple, lilac, lavender, gray-lavender, violet, pale-violet, purplish-pink, or pink, sometimes pink with a white center or lavender with a white throat, its tube protruding slightly beyond the calyx, very finely pubescent outside the throat, hairy inside, its limb 5-parted, 2--3 mm. wide; nutlets trigonous, linear, 2--2.5 mm. long, the dorsal surface sharply raised-reticulate above, striate below, the ventral surface with the commissural faces reaching to the distal end of the cocci, muricately scabrous, densely set with unequal strongly bulbous acute strigullae; chromosome number: 2n = 14 or n = 14 [Solbrig].

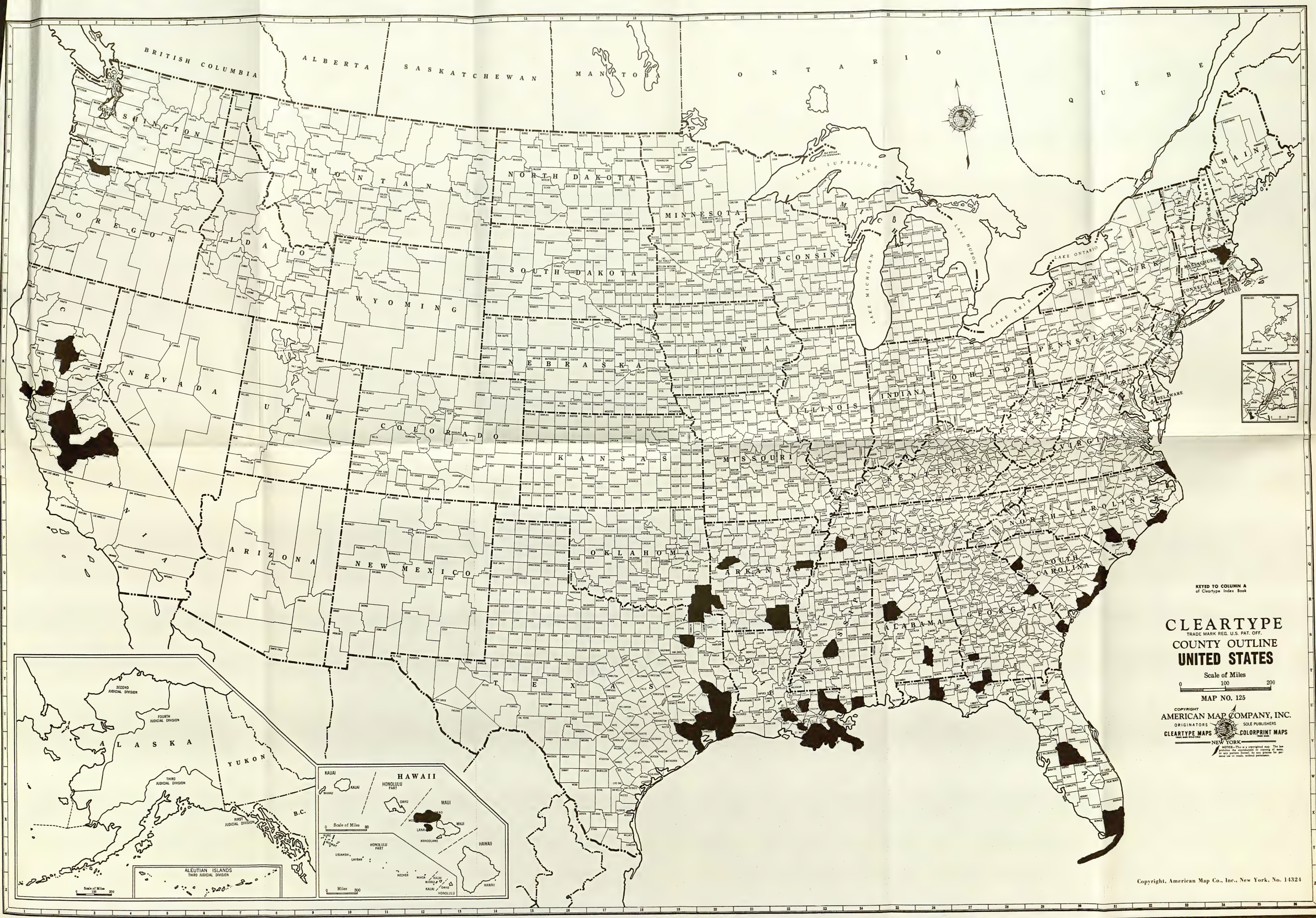
The type of this extremely common and variable species was collected from cultivated material growing in the Botanical Garden at Madrid, Spain, in 1801, and is deposited in the herbarium there. The type of V. confinis was collected by Elmer Ottis Wooton (no. 409) in the Organ Mountains, Dona Ana County, New Mexico, on August 30, 1897; that of V. imbricata is Wooton 2831, collected at Farmington, San Juan County, New Mexico, on August 8, 1904, deposited in the United States National Herbarium at Washington. The type of V. rudis was collected by Charles Fuller Baker (no. 564) at Arboles, Archuleta County, Colorado, on June 18, 1899.

It is worthy of note here that V. repens Bertol., V. repens Larraf., and V. repens Savi are synonyms of Phyla nodiflora (L.) Greene; V. repens Ten. is a synonym of Phyla nodiflora var. rosea (D. Don) Moldenke; V. prostrata R. Br. is V. lasiostachys Link; V. stricta x bracteosa A. S. Hitchc. is xV. perriana Moldenke; and the V. stricta x bracteosa of Bebb, of Eggert, of Mackenzie, of Rydberg, and of Sandberg are all xV. deamii Moldenke.

Texan collectors describe V. bracteata as an annual with gray-lavender or violet corollas.

Figure 4. Distribution of Verbena bonariensis in the United States

Mapping by counties done by Andrew R. Moldenke



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NOTES ON NEW AND NOTEWORTHY PLANTS. XXXI

Harold N. Moldenke

BOUCHEA FLUMINENSIS f. ALBIFLORA Moldenke, f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Padre Aloysio Sehnem (no. 4056) on the bank of a river, at an altitude of 100 meters, at Santa Teresa de Forromeco, Montenegro, Rio Grande do Sul, Brazil, on November 15, 1949, and is deposited in the herbarium of the Botanisches Museum at Berlin. The collector notes that this plant is very rare.

CALLICARPA LONGIPES var. LAUI Moldenke, var. nov.

Haec varietas a forma typica speciei pilis longis glandulif-eris hirsutis recedit.

This variety differs from the typical form of the species in having its pubescence on the petioles, leaf-blades, branches, peduncles, inflorescence-branches, pedicels, and calyx hirsute, elongate, divergent at right angles to the base, and gland-tipped.

The type of the variety was collected by S. K. Lau -- in whose honor it is named --and is his no. 3927 from Sai Hang Cheung, near Tung Lei village, Kiennan District, Kiangsi, China, between July 28 and 30, 1934, and is deposited in the United States National Herbarium at Washington.

PREMNA MACROPHYLLA var. GLABERRIMA Moldenke, var. nov.

Haec varietas a forma typica speciei ubique glaberrima recedit.

This variety differs from the typical form of the species in being completely glabrous throughout.

The type of the variety was collected by André Joseph Guillaume Henri Kostermans (no. 1267) at Ku-Jae, about 150 km. northwest of Kanburi, at an altitude of 100--150 meters, Thailand, on July 20, 1946, and is deposited in the United States National Herbarium at Washington. He describes it as a shrub 0.5 m. tall, with white flowers, and the subterranean part woody.

TEIJSMANNIODENDRON PIERREI Moldenke, sp. nov.

Arbor parva; ramis conferto-tortuosis glabris nitidis; foliis 1-foliolatis coriaceis lanceolatis utrinque glabris nitidisque, ad apicem acutis, ad basin subacutis, integris; inflorescentiis racemosis vel subpaniculatis paucifloris.

Small tree, about 12 m. tall; branches much twisted and tangled, glabrous, shiny; branchlets and twigs rather slender, obscurely subtetragonal or subterete, very pale-gray, glabrous,

very shiny; principal internodes much abbreviated, mostly 1.5 cm. long or less; nodes not annulate; leaves decussate-opposite, 1-foliolate, numerous, rarely binary; petioles rather heavy, short, 10--15 mm. long, glabrous, shiny, swollen at the apex and base, articulate at the apex; leaf-blades coriaceous, uniformly dark-green on both surfaces, lanceolate, 3--13 cm. long, 1.1--4.8 cm. wide, smooth and very shiny on both surfaces, acute or short-acuminate at the apex, entire, subacute at the base; midrib slender, slightly prominent above, sharply prominent beneath; secondaries slender, about 10 per side, arcuate-ascending, mostly flat above, very slightly prominulous beneath, arcuately joined near the margins beneath; veinlet reticulation invisible above, mostly obscure beneath; inflorescence apparently racemose and axillary and perhaps also terminal and subpaniculate, rather few-fruited, apparently simple, 5--15 cm. long, the peduncle and rachis glabrous and shiny; fruiting-pedicels heavy, about 5 mm. long, glabrous; fruiting-calyx cupuliform, to 7 mm. long and 15 mm. wide, heavy, glabrate, the rim entire or subentire.

The type of this species was collected by Jean Baptiste Louis Pierre (no. 37) -- in whose honor it is named -- in the Dinh mountains at Baria, southern Cochinchina, Indochina, in March, 1867, and is deposited in the Britton Herbarium, from the Krukoff Herbarium, at the New York Botanical Garden. The collector names the common Annamese name "com tao" or "kum tao" and says that the corolla is blue. Dop identified it as Vitex holophylla Baker.

xVERBENA GONZALEZI Moldenke, nom. nov.
Glandularia santiaguensis x pecakii Schnack & Gonzalez, Revist. Argent. Agron. 12: 285. 1945.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. V

Harold N. Moldenke

VERBENA BRACTEATA Lag. & Rodr.

Demaree states that "old stems will get covered up by sand and dozens of new branches will come up." Whitehouse 16263 was taken from a plant so large that three full herbarium sheets were made from it. E. J. Hill 269.1889 in the University of Illinois herbarium has the spikes especially densely flowered. The erect form of the species is well exemplified by Clokey 8096 from Nevada and by Ownbey & Weber 2746a and by J. H. Christ 12973 from Idaho. Ownbey & Weber 2746b is the typical prostrate form. Ewan 11418 has its leaves extra finely cut. The physico-chemical properties of the sap in relation to phytogeography are discussed by Harris (1934) on the basis of specimens collected

(1) in a broad wash through sagebrush community west of Grantsville, near the old Wrathall ranch, Stansbury Mountains, Tooele Valley, Utah, (2) from drifting sand or sand-ridges on the second terrace of the Sevier River, Utah, beyond the bridge on the Lynndyl-Oak City road, and (3) from the drift zone of the sandy beach of Utah Lake, near Provona Beach, west of Provo, Utah.

Verbena bracteata has been found by collectors in a tremendous variety of habitats, including along roadsides and roadside ditches, on gravelly banks and sand ridges, in sandy pastures, river bottoms, and scattered pinewoods, along the borders of lakes, the edges and bottoms of dried-up ponds, on sandy roadside banks and sandy sagebrush slopes, in alleys and parking strips, on plains and prairies, dry sunny or low prairies and dry meadows, on dredged land at the edges of ponds, on sandy riverbanks and sagebrush flats, on grassy flats of Bouteloua gracilis, in orchards, meadows, farmyards, and dooryards, on dry rocky riverbanks and river bluffs, on gravel- and sand-bars, among grass in parks, open grasslands, on arid plains, clay prairies, and clay ridges, in gypsum and the muck of lake-beds, on damp sandy-gravel flats, ditch-banks, and deserts, in the cinder beds along railroad tracks, on the banks of sloughs, in sandy sagebrush deserts, on sand or saline flats, gravelly or sagebrush hillsides, and gravelly prairies, in moist meadows and low moist or open places, on buttes and high plains, in the desert adjacent to cultivation, in blackland prairies and near or along irrigation ditches, on seaport ballast, in alluvial flat waste places, on sandy clay-loam bottoms, at the margins of epsom lakes, in bare clay areas on hilltops, in dry gravel or loam near rivers, on limestone slopes, in dry xeric outcrops and domes of the Viola Lime formation, and on brushy flats. It has been found growing in clay, red clay, and sandy clay soil, heavy or rocky soil, sun-baked clay adobe, earthy soil of limestone areas, loose gravelly or dry gravelly soil, sandy, dry sandy, dry sandy sunny, and even very dry sandy soil, as well as in damp or low moist or dry rocky soil, hard dry or adobe soil, in granitic, igneous, or dry grassy waste soil, and even pure sand. It is often found in sandy soil in sunny places, damp soil by streams, and moist soil along lakeshores. It is most common in waste places and open places generally, along sidewalks, and in railroad ballast. I have personally seen it in very dry windswept places at the seaward side of the lighthouse at Montauk Point, Long Island. Collectors describe it from dryish or sandy canyon floors, sandy level terraces, yellow pine forests, sandy lake-margins, and rocky pastures, from wharves and railroad sidings, lumberyards, dry rocky places, clay soil in prairies, fields about ponds and the edges of fields, dry slough bottoms, dry or sandy riverbanks, and streets, fields in the juniper belt, vacant pastures and lots, semi-cultivated fields, dry knolls, sandstone mesas, sand hills, gravel bluffy and grassy roads, in very dry hills, silty soil in valleys, the dry sand of lake-margins, borders of thickets, alkali flats, moist spots of flat prairies, Sarcobatus flats, sandy plains and riverbottoms, rocky hillsides and dry clay slopes, sandhills and

creek bottoms, along ditches on level prairies, and at the edges of runoffs. It is said to inhabit dry mesas and dry grassy bunch-grass land, sandy, open sandy, and low sandy ground, dry ground and dry hard or dry open ground, dry sterile or nearly cleared ground, low ground, and ballast ground. It seems to like gravelly mesas and dry gravel hills, gravel shoulders of highways, dry lakebeds, sandy alluvium and sandy, sandy loam, or open roadsides, dry rocky or sandy ridges, low waste places and grassy situations, clearings, dry sandy prairies that are exposed to the wind, graded roadsides in pine forests, steep prairie-covered loess bluffs, muddy ditch-banks in prairie soil, dry crevices and ledges of Sioux Quartzite, sandy dry banks, and weedy roadsides. It is commonly met along watercourses and lakeshores, near ponds, on ledges and drying banks, in sandy or bare clay areas, and in the open sod of dry prairies. It has been found growing well in rich or moist black loam, as well as in sandy, alluvial sandy, or clay loam. It has been collected at altitudes of 100 to 9000 feet, flowering and fruiting continuously from April to October.

Gates states that it inhabits "dry places along roads and on prairie and plains" throughout Kansas, and that it is a therophyte or hemicryptophyte; Mackenzie found it common in sandy soil in Wyandotte County of that state; Hancin says "common in waste places". In Alabama Earle (1902) reports it as only "occasional, roadsides and waste places". Pammel says it is common as a weed along roadsides and in pastures, associated with *V. stricta* Vent., *V. hastata* L., *Juncus tenuis* Willd., and *Persicaria mitis* Gilib. In Iowa Tolstead reports it from sandy soil mixed with cinders and gravel, exposed to full sunlight in well-drained land. Welch asserts that in Indiana it is "common" in Jasper County, while Grimes reports it as growing along with *Diodia teres* Walt. along railroad rights-of-way in Putnam County. "Large mats are common" in Siskiyou County, California, according to Cooke, while Moffatt says it is "abundant in old pastures" in Du Page County, Illinois. In Arizona Hanson found it "common and abundant in waste places", Whiting describes it as a "weed in wash bottoms", and Heller found "prostrate plants forming mats in low ground." Grassl found it "common near base of ridges", Cutler "common in dry fields", and Marcelline "common in yards and gardens" in New Mexico. Voss encountered it "occasional in hard-packed roadsides in Michigan". Nobs and Smith discovered it with *Cressa*, *Sida*, and *Frankenia* on dry mud flats in California. Head says that it is scarce in rich soil of dry lakebeds in Jeff Davis County, Texas. St. John says that it is "common in dry places, persisting as a weed in dry farming regions in upper Sonoran and arid Transition zones" in Washington.

It is found "along streets and in open waste places" in Washington County, Arkansas, according to Harvey; "abundant in dry sandy fields" in Fairfield County, Connecticut, according to Eames;"in dry clearings of conifer woods on hillsides" in Keweenaw County, Michigan, according to Hermann; and as a "weed in cinders along railroad tracks" in Sussex County, New Jersey, ac-

cording to Clausen & Edwards. In the state of Washington Smith found it "below highwater line along the river" in Grant County, while Dana collected it in the bottom of a coulee and scattered on prairies in Franklin County. Scoggan says that in Manitoba he found it on "saline prairie and dried middle river channel", while Dodge found it "plentiful" at Point Edward, Ontario, where many other botanists have also encountered it as a weed. Blankinship describes it as a "roadside weed" in Gallatin County, Montana, and Flint comments that it inhabits "little-used roadbeds in gravelly disintegrated granite, with no forage value" in Jefferson County. In Kentucky it is "a prostrate tough weed of door- and barnyards", according to Shacklette. Benson lists it as a denizen of the Lower and Upper Sonoran and Transition life-zones. Fogg encountered it as a "weed along sidewalks" in Philadelphia County, Pennsylvania. In Utah it is described as a "weed in yards" by Maguire & Becraft (Millard County) and "local in somewhat moist sandy bottoms" (Juab County) or "common in the streets of Kanab" by Tidestrom (Kane County), "in sand with Artemisia tridentata" by Keck (Millard County), "common along roadsides" by Pammel & Blackwood (Salt Lake County), "frequent in open spots in dry soil" by Cutler (Juab County), while Gould says "in heavy black soil of drying banks of vernal pools". In California's Merced County it grows on dry mudflats with Cressa, Frankenia, and Sida, and in salt sloughs with Chenopodium and Gnaphalium. In Waukesha County, Wisconsin, Pohl encountered it as "common and low in schoolyards with Eragrostis, Poa, Matricaria, and Melilotus". In Iowa, according to Pammel, it is "common in waste places, roadsides, walks, gravelly and sandy fields; abundant...on gravel on knolls with V. stricta and Baptisia leucophaea and in cultivated ground." Fawcett reports it as "common in sandy prairies and waste places.....Mississippi Valley from Florida and Alabama to Minnesota, British Columbia and Arizona." Jones avers that it is an inhabitant of the Lower Temperate life-zone in Lincoln County, Nevada, while Holmgren reports it "frequent as a roadside weed in dry gravelly soil," and Clokey collected it in a "field in juniper belt" and "roadsides in Larrea belt" in the same state, but Allen reports it "not common" in Lyon County.

In Idaho, Sandberg, MacDougal, & Heller say it is "frequent on rocky hillsides"; Schallert says it is "common in deserts" of Arizona. It grows on "dry banks of treeless creeks" in Oregon, according to Lawrence, in "dry fallow ground, especially along run-off rain washes" and "fairly common in dry sand" in Boulder County, Colorado, according to Ewan, and "infrequent in moist pastures, in sandy loam soil" in Grant County, New Mexico, according to Maguire, Richards, & Moeller. Waterfall found it in openings in pine forests on shale hillsides in Rio Arriba County, New Mexico, and on rolling plains among numerous clumps of Yucca in Cimarron County, Oklahoma. The Degeners found it on gravel on an open Juniperus plateau in Colorado.

Miss Perry, in her excellent monograph of the North American members of this genus (1933), gives the distribution of V. brac-

teata as "Waste places, Maine to Florida, west to California and northern Mexico". She also remarks that this is "A readily recognized and widely distributed species varying greatly in habit and pubescence as well as in length and position of floral bracts. The typical form is a sprawling hirsute plant with laxly ascending branches and spreading bracts. In New Mexico it appears as a nearly erect herb (V. imbricata Woot. & Standl.) with shorter and ascending or appressed bracts (var. brevibracteata Gray). Some phases of this variation occur throughout the northwest range of the species, but since these tendencies to vary are apparently lacking in correlation, they do not seem worthy of nomenclatorial attention." R. J. Ferris 9770 is supposed to represent the var. brevibracteata type well, although it was distributed at V. robusta Greene.

Hegi (1927) says of its occurrence in Germany "1864 von Stocker eingeschleppt bei der Baumwollspinnerei Feldkirch gefunden" and also remarks that it is useful in the treatment of scrofula.

Palmer (1935) describes the habitat of V. bracteata as "fields, roadsides, and waste ground. Circumneutral. General". It is probable that the species is native from Michigan, Ohio, and Tennessee westward to the Pacific Coast and south to Texas and northern Mexico, and has been introduced locally in portions of Canada from Ontario to British Columbia and along the eastern and Gulf seabord from Maine to Florida and Louisiana. Renner says that it is grazed from June to October in New Mexico.

The "Swanson" County, Oklahoma, recorded for this species by me in my Résumé 26 (1959) appears to be an error. There is no such county in Oklahoma, nor can I locate a town by that name in the state. The "Riverside" County, Colorado, recorded on page 24 of the same work appears to be an error for Riverside County, California, and the "Alturas" County, Idaho, on the same page seems to be an error for the town of Alturas in Modoc County, California.

The Arsène s.n. in the Berlin herbarium bears a label reading "Pl. du Mexique", but there is also an inscription reading "vicinity of Santa Fé", so I am assuming that the plant was actually collected near Santa Fé in what is now the state of New Mexico, U. S. A.; likewise a similar sheet in the Britton Herbarium at the New York Botanical Garden is inscribed "Las Vegas", which I assume refers to Las Vegas, New Mexico (not Nevada). The Howell s.n. from "Cascades" and the Gorman s.n. from "Lower Cascades", Oregon, cited hereinafter from Hood River County, might as well have been collected in Wasco County. H. H. Rusby s.n. [Oak Creek, May 30, 1883] may have come from either Coconino or Yavapai Counties, Arizona; Edw. Palmer 1048 may well have actually been collected in Nuevo León, Mexico. Whitehouse 8739 may have come from Santa Fe County, New Mexico — its indefinite label reads merely "Las Vegas — Santa Fe"; similarly, Tharp 6274 and 6284 could have come from either Lamb or Lubbock County, as their

labels read merely "Lubbock -- Littlefield", Texas; Tweedy 3365 may have been collected in either Johnson or Sheridan County, Wyoming -- its label reads "between Sheridan and Buffalo"; W. H. Rhoades s.n., cited below from Van Buren County, Michigan, could have originated in Kalamazoo County, since its label says "between Papaw and Kalamazoo". The Fremont s.n. collection cited below was marked "Mexico" by Mrs. Palmyra Mitchell at the New York Botanical Garden, on what basis I do not know. Parish 8490 bears a printed label reading "Plants of Southern California", but in longhand is stated "Bottomlands of the Colorado River, Ft. Yuma", so I assume that it came from what is now Yuma County, Arizona. Parish & Parish 2171 was collected at San Bernardino, California, in 1891 -- in 1914 a note was added by one of the collectors "this station is destroyed and I no longer find the species at San Bernardino."

The A. S. Hitchcock s.n. [McPherson, July 1892], cited below, is cited in the Flora Kansana as "V. hastata x bracteosa", while the s.n. [Wabaunsee Co., Aug. 23, 1896] is there cited as V. canadensis. Over s.n. [July 14, 1914], Cutter 33, and Smith & Rinehart 82 are mixtures with V. bipinnatifida Nutt.; Oyster s.n. [July 1885] is a mixture with something boraginaceous, while Bethel s.n. [1910] in the herbarium of the California Academy of Sciences is mixed with a species of Lycopus; Arsène 1885 in the Pomona College herbarium is a mixture with V. plicata Greene, and Burk s.n. [Girard Point] is a mixture with V. canadensis (L.) Britton. G. D. Fuller 10186 in the herbarium of the Illinois State Museum, distributed as V. bracteata, is actually Veronica arvensis L. in the Scrophulariaceae; Loomis 3133, distributed as this species, is Monarda mollis L.; C. Wright 1545, at least insofar as the Columbia University Herbarium specimen is concerned, is not verbenaceous; Earle s.n. [Auburn, 16 May 1896], distributed as Verbena bracteata, is Phryma leptostachya L. in the Phrymaceae. Wallis 4944-1 is a mixture with V. bipinnatifida. J. Lauber 101 [4483], distributed as V. bracteosa, is actually V. ciliata Benth., Edw. Palmer 342 is V. lasiostachys var. septentrionalis Moldenke, J. B. Davy 16 is V. quadrangulata Heller, and Lapham s.n. [M. Spear, 1858] is xV. perriana Moldenke.

In spite of the extremely distinctive characters of Verbena bracteata, material of this species has been misidentified and distributed in herbaria as V. ambrosifolia Rydb., V. aubletia L., V. bipinnatifida Nutt., V. canadensis (L.) Britton, V. canescens H.B.K., V. canescens var. neo-mexicana A. Gray, V. caroliniana Gmel., V. ciliata Benth., V. gracilis Desf., V. hastata L., "V. hastata var.", V. hastata x bracteosa Gates, V. menthaefolia Benth., V. plicata Greene, V. prostrata R. Br., V. pumila Rydb., V. robusta Greene, V. spuria L., V. wrightii A. Gray, Lippia cuneifolia Steud., and even Gentiana bracteosa Greene!

As is to be expected in the case of a species with such a wide distribution, the list of popular names is rather long, including "bracteated vervain", "bracted verbena", "bracted vervain", "hoary vervain", "large bracted vervain", "large-bracted vervain", "large-bracted vervaine", "large bracted vervane", "large-bracted vervane", "large bracted verwain", "large-leaved vervain", "lavender ground-flower", "long-bracted vervain", "mat verbena", "prostrate vervain", "small verbena", "spreading vervain", "verbean vervain", "verbena", "vervain", "verveine", and "vervian" It should be noted, however, that the name "hoary vervain" is more properly applied to V. stricta Vent., while "verveine" is applied also to the genus Verbena as a whole as well as to V. bonariensis L., xV. hybrida Voss, V. officinalis L., Phyla nodiflora (L.) Greene, and Stachytarpheta jamaicensis (L.) Greene, and "verbena" is applied to the genus Verbena as a whole, as well as to V. bonariensis L., V. corymbosa Ruíz & Pav., V. hastata L., xV. hybrida Voss, V. litoralis H.B.K., V. officinalis L., V. peruviana (L.) Britton, V. platensis Spreng., V. stricta Vent., V. urticifolia L., Bouchea prismatica (L.) Kuntze and its var. longirostra Grenz., Clerodendrum fragrans var. pleniflorum Schau., Priva lappulacea (L.) Pers., Stachytarpheta calderonii Moldenke, S. cayennensis (L. C. Rich.) Vahl, S. frantzii Polak., S. guatemalensis Moldenke, and S. jamaicensis (L.) Vahl

Our species is mentioned by Wyman & Harris (1941) under the form-genus name "?aze·(č'il) bilátah do.ł' izígi", and is said to be used by the Navajos to stop postpartem hemorrhage. Seymour (1929) records the following fungi as infesting it: Aecidium verbenae Auct. Amer., A. verbenicola Ell. & Kellerm., Dicaeoma verbenicola Arth., Puccinia sydowiana Diet., P. verbenicola Arth., Erysiphe cichoracearum DC., and Septoria verbenae Rob. It was introduced into cultivation in 1801 or earlier, and Bailey (1935) lists Cronamere as offering it to the horticultural trade. The "8743" cited in Univ. Calif. Publ. Bot. 24: 198 & 274 (1951) is probably a misprint for Clokey 8473.

MacDougal (1907) suggests that what he calls V. bracteosa Michx. (now more correctly known as V. bracteata Lag. & Rodr.) may hybridize in the wild with V. canadensis (L.) Britton, with V. hastata L., and with what he calls V. angustifolia Michx. (now more correctly known as V. simplex Lehm.). However, he cites no specimens, gives no descriptions of the supposed hybrids, and does not say that he actually ever saw any such hybrid plants. I doubt very much whether these species hybridize and certainly have never yet seen any such hybrids myself. The only hybrids which I recognize are xV. bingenensis Moldenke [V. bracteata Lag. & Rodr. x V. lasiostachys var. septentrionalis Moldenke], xV. deamii Moldenke [V. bracteata Lag. & Rodr. x V. stricta Vent.], and xV. perriana Moldenke [V. bracteata Lag. & Rodr. x V. urticifolia L.].

A. H. Smith (1868) records V. bracteata as "rare" at Kaign's Point, Philadelphia, Pennsylvania. J$_o$nes (1941) records it from Ross County, Ohio, on the basis of a Bartley & Pontius collection. Lowe (1943) says it is occasional on prairies and waste ground at Elgin, Lena, Lyleton, and Ninga, Manitoba -- I have not yet seen material from the first two of these localities. Jepson (1943) records it from Kern County, California; Braun (1943) from Mc Creary County, Kentucky; Harper (1924) from Scioto County, Ohio; Clausen (1939) from Camden County, New Jersey; Monachino (1960) from Bronx County, New York; Porter, Woodward, Pride, & Howard (1940) from Worcester County, Massachusetts; Deam, Yuncker, & Friesner (1950) from Marion County, Indiana; and Ogden, Steinmetz, & Hyland (1948) from Cumberland and Penobscot Counties, Maine; while Palmer (1916) cites his no. 454 from Jasper County, Missouri. Schauer (1847) cited a Schrader collection from Illinois, as well as non-localized Michaux and Douglas collections; Farwell (1938) records it from Houghton and Wayne Counties, Michigan, and says "The Keweenaw stations extend the range of this species much farther north than it is generally recorded". Muenscher says that it is "Native from Ohio westward and southward; locally introduced in the northeastern states and on the Pacific coast." Groh (1944) says that in Canada it is an annual, found in sod and waste places in dry land. He cites the following material not as yet seen by me: ONTARIO: Lambton Co.: Groh s.n. [Pt. Edward, 1924]. Middlesex Co.: Groh s.n. [Strathroy, 1924]. "Westmeath": Grylls s.n. [1935]. MANITOBA: Brandon Co.: Groh s.n. [Wawanesa, 1932]. "Long River Valley": Burman s.n. SASKATCHEWAN: Maple Creek Co.: Campbell 95. Regina Co.: Carmichael 89. Swift Current Co.: Groh s.n. [Cabri, 1933]. "Forget": Russell & Ledingham 1345. ALBERTA: Lethbridge Co.: Fyles s.n. [Lethbridge, 1914]; Groh s. n. [Lethbridge, 1929]. North Battleford Co.: Carmichael 75. "Cavendish": Campbell 44. BRITISH COLUMBIA: Cariboo Co.: Fletcher s.n. [Lake Kamloops, May 29, 1885]. Yale Co.: Eastham s.n. [Osoyoos, 1938]; Groh 243. He notes that the Point Edward "infestation" dates back to 1889, at least, since the species was found there by Dearness, according to Macoun's Catalogue. David Macoun also collected it "near the forks of the Red Deer and Saskatchewan rivers, Aug. 8, 1879."

Douglas H. Kent, in a letter to me dated November 28, 1949, says that the species is adventive in England. Thurston & Vigurs (1922) cite a Harvey collection from Bodmin Road Station, Cornwall, collected in 1918. Gay (1849) says "En la quinta noticia de las plantas raras del jardin botánico de Ginebra, A. de Candolle indica esta especie como propria igualmente de Chile, lo que es muy dudoso." I have not as yet seen any material of it from Chile, wild or cultivated.

Perry (1933) cites the following 320 additional specimens not as yet seen by me: ONTARIO: Lambton Co.: Macoun s.n. [Point Edward, Lake Huron, 19 July 1901] (N). BRITISH COLUMBIA: Cariboo Co.: Macoun s.n. [Kamloops, June 13th 1889] (W). MAINE: Cumber-

land Co.: Chamberlain 418 (G). MASSACHUSETTS: Norfolk Co.: Rich s.n. [Dedham, 4 Aug. 1900] (G). Worcester Co.: Dewhurst s.n. [Worcester, 27 June 1904] (G). CONNECTICUT: Fairfield Co.: Eames 8137 (G). Litchfield Co.: Fernald s.n. [Winsted, Winchester, 5 Sept. 1909] (G). NEW YORK: Suffolk Co.: Von Schrenk s.n. [Montauk Point, 23 July 1895] (E). NEW JERSEY: Camden Co.: Parker s.n. [Kaign's Point, Camden, 20 July 1866] (E, G). Hudson Co.: Van Sickle s.n. [Weehawken, Aug. 1894] (W). PENNSYLVANIA: Lancaster Co.: A. A. Heller s.n. [Lancaster, 29 Aug. 1900] (W). Lehigh Co.: Churchill s.n. [Cementon, 20 Aug. 1923] (G). NORTH CAROLINA: Iredell Co.: Ruger s.n. [Statesville, June 1872] (W). GEORGIA: Bartow Co.: Ravenel s.n. [Cartersville] (N). DeKalb Co.: Eggert s.n. [Stone Mountain, 24 May 1897] (E). Gwinnet Co.: H. A. Allard 207 (E, W). Lee Co.: J. D. Smith s.n. [Smithville, 18 Aug. 1885] (E). FLORIDA: Franklin Co.: Biltmore Herb. 1082b (W). County undetermined: Buckley s.n. (E); Chapman s.n. (E). ALABAMA: DeKalb Co.: Ruth 518 (E). Etowah Co.: Eggert s.n. [near Atalla, 9 July 1898] (E, N). Jackson Co.: Ward s.n. [Stevenson, 5 Sept. 1877] (W). Lee Co.: Earle & Baker s.n. [Auburn, 13 May 1898] (W). Mobile Co.: Mohr s.n. [Mobile, 22 May 1884] (W). County undetermined: Rugel s.n. [Sept. 1843] (E). OHIO: Erie Co.: Moseley s.n. [Sandusky, 14 Aug. 1920] (G). ILLINOIS: Kane Co.: Sherff 1797 (E). Mason Co.: Gleason s.n. [Havana, 18 Aug. 1904] (G). Menard Co.: E. Hall s.n. [Athens] (W). Piatt Co.: Seymour & Waite s.n. [Monticello, 17 June 1886] (G). Winnebago Co.: M. S. Bebb s.n. [Fountaindale, 1887] (G). INDIANA: La Porte Co.: Mell & Knopf s.n. [Michigan City, 6 July 1903] (E). Steuben Co.: C. C. Deam 1272 (E, W). IOWA: Black Hawk Co.: Burk 542a (E). Chickasaw Co.: Rolfs s.n. [Lawler, 1890] (G). Fayette Co.: Fink s.n. [30 July 1894] (W). Pottawattamie Co.: Vasey s.n. [Council Bluffs] (G). Story Co.: Ball s.n. [Ames, 5 Aug. 1896] (E, G, N, W); H. S. Fawcett 12 (E, G, W). KENTUCKY: Jefferson Co.: Bergmann s.n. [southern Louisville, 19 Aug. 1892] (E). County undetermined: Rafinesque s.n. (G). TENNESSEE: Cheatham Co.: Eggert s.n. [Kingston Springs, 19 Aug. 1897] (E). Franklin Co.: Eggert s.n. [Sherwood, 9 June 1897] (E). Shelby Co.: Fendler s.n. [Memphis, 22 June 1851] (G). MICHIGAN: Cheboygan Co.: J. H. Ehlers 627 (G). Manistee Co.: Morong s.n. [Manistee, 8 Aug. 1882] (G). WISCONSIN: Dane Co.: Churchill s.n. [Madison, 27 Aug. 1893] (G). Sauk Co.: Eggert s.n. [near Mirror Lake, 13 July 1903] (E). County undetermined: Schuette s.n. [Fort Howard, 22 July 1887] (G, W). MINNESOTA: Hennepin Co.: Mearns 524 (W); Schuette s.n. [hills between Minnehaha and Fort Snelling, 5 July 1888] (G). Mille Lacs Co.: E. P. Sheldon s.n. [Princeton, July 1892] (G, W). Stearns Co.: Chandonnet

s.n. [Collegeville, 29 July 1912] (E). Wabasha Co.: Manning s.n. [Lake City, 25 July 1883] (G). NORTH DAKOTA: Benson Co.: Lunell s.n. [Leeds, 10 Sept. 1896] (G, W). Morton Co.: Sarvis 122 (W). Richland Co.: Bergman 2370 (E). Stark Co.: Holgate s.n. [Dickinson, 14 Aug. 1908] (G). SOUTH DAKOTA: Lawrence Co.: Carr 179 (E, G, W); Rydberg 934 (W). Meade Co.: Forwood 298 (W). Walworth Co.: Visher 3359 (E). KANSAS: Grant Co.: C. H. Thompson 42 (E, W). Hamilton Co.: Rydberg & Imler 1008 (E). Kearney Co.: A. S. Hitchcock 1129 (E). Morton Co.: Rose & Fitch 17106 (W). Riley Co.: J. B. S. Norton 392 (E, G, W). MISSOURI: Butler Co.: Kellogg 15276 (E). Greene Co.: P. C. Standley 9362 (W). Jackson Co.: B. F. Bush 2109 (E), 4010 (E, G), 8537 (E). Jasper Co.: E. J. Palmer 454 (E); W. Trelease 494 (E). Jefferson Co.: F. Wislizenus 284 (E). Marion Co.: J. Davis 2691 (E), 3587 (E), 9039 (E). Pike Co.: J. Davis 2414 (E). Polk Co.: W. Trelease 715 (E). Taney Co.: B. F. Bush 601 (E). Wayne Co.: E. J. Palmer 6106 (E). Saint Louis: Eggert s.n. [Jefferson Ave., St. Louis, 2 July 1875] (E); Engelmann s.n. [St. Louis, Sept. 1841] (G, W); Riehl 9 (E). ARKANSAS: Craighead Co.: Demaree 3353 (E), 3371 (E, G). Hempstead Co.: B. F. Bush 1034 (E). Independence Co.: W. Trelease s.n. [Batesville, 1 Sept. 1897] (E). Sebastian Co.: Bigelow s.n. [Fort Smith, 1853-54] (W). Washington Co.: F. L. Harvey 62 (E). LOUISIANA: Rapides Par.: C. R. Ball 553 (E, G, W). MONTANA: Dawson Co.: J. Ball s.n. [near Glendive, 19--21 Aug. 1884] (G); Ward s.n. [Glendive, 17 July 1883] (W). Sanders Co.: Sandberg, MacDougal, & Heller 972 (G, W). IDAHO: Ada Co.: J. A. Clark 55 (E, G, W), 279 (E, G, W); Mulford s.n. [Boise, July 1892] (E, G). Canyon Co.: J. F. Macbride 200 (E, W). Fremont Co.: Merrill & Wilcox 776 (G, W). Nez Perce Co.: Sandberg, MacDougal, & Heller 264 (E, G, W). County undetermined: L. F. Henderson 4070 (W). WYOMING: Albany Co.: A. Nelson 7671 (E, G, W). Natrona Co.: Goodding 207 (E, G, W). Yellowstone National Park: Mearns 2698 (W), 5009 (W). County undetermined: A. Nelson 320 (E, G, W). UTAH: Beaver Co.: Goodding 1022 (E). Emery Co.: M. E. Jones 5478 (E, W). Piute Co.: Rydberg & Carlton 7043 (G, W). Salt Lake Co.: Pammel & Blackwood 3589 (E, G); S. Watson 823 (G, W). Sanpete Co.: Ward 256 (G, W). NEVADA: Clark Co.: Goodding 2312 (E, G); S. B. Parish 10288 (E, G). COLORADO: Archuleta Co.: C. F. Baker 564 (E, F, G). Denver Co.: Eastwood 25 (E, G, W). El Paso Co.: Clements 9 (E, G, W); Drushel 4387 (E). Gunnison Co.: C. F. Baker 920 (E, G, W). Larimer Co.: C. S. Sheldon 38 (G). Montrose Co.: C. F. Baker 288 (E, G). Otero Co.: Rose & Fitch 17503 (E, W). NEBRASKA: Cedar Co.: Clements 2612 (G, W). Kimball Co.: A. A. Heller 14303 (E). Lancaster Co.: Webber s.n. [Lincoln, 20 June 1888] (W). County undetermined:

Hayden 10 [banks of Yellowstone River] (E). OKLAHOMA: Comanche Co.: M. K. Clemens 11750a (E). Creek Co.: Bush 436 (E). Kiowa Co.: G. W. Stevens 1192 (G,N). Leflore Co.: Blakeley 1462 (G). Texas Co.: G. W. Stevens 391 (E). Woods Co.: G. W. Stevens 680 1/2 (G), 2889 (G). TEXAS: Dallas Co.: Reverchon 736 (E), 2116 (E). El Paso Co.: C. Wright 454 (G, W), 567 (G), 1499 (E, G, N). Howard Co.: Havard s.n. [west of Big Spring, Sept. 1881] (W). Lubbock Co.: E. J. Palmer 12496a (E). Randall Co.: Eggert s.n. [banks of Red River, 13 Aug. 1900] (E); E. J. Palmer 13861 (E). Tarrant Co.: Ruth 109 (E, G, W). Taylor Co.: S. M. Tracy 8001 (E, G, W). Val Verde Co.: Parry, Bigelow, Wright, & Schott s.n. [below Doñana] (W). NEW MEXICO: Bernalillo Co.: Arsène & Benedict 16600 (E); C. C. Ellis 221 (E, W); E. J. Palmer 31117 (E). Chaves Co.: Earle 351 (E, W). Colfax Co.: Griffiths 5560 (E); P. C. Standley 6268 (W). Dona Ana Co.: Wooton 409 (E, G, W); Wooton & Standley 3330 (E, F). Eddy Co.: Wooton s.n. [Queen, 2 Aug. 1909] (E, W). Grant Co.: O. B. Metcalfe 137 (E, G, W). Sandoval Co.: Arsène & Benedict 16790 (D). San Juan Co.: Wooton 2831 (W). San Miguel Co.: Arsène 18399 (D), 18407 (E); P. C. Standley 5136 (E, W). Santa Fe.: Arsène & Benedict 15734 (E); P. C. Standley 4458 (E, W), 4549 (E, G, W). Sierra Co.: O. B. Metcalfe 897 (E), 1008 (E, G, W). Socorro Co.: H. H. Rusby 336 (E). County undetermined: Fendler 587 (D, E, G, W), 592 (E). ARIZONA: Apache Co.: Goodman & Hitchcock 1317 (E). Coconino Co.: Clute 93 (E, G, W); H. C. Hanson A.147 (E); MacDougal 286 (D, G, W). Yavapai Co.: Peebles, Harrison, & Kearney 4243 (W). WASHINGTON: Benton Co.: Cotton 621 (E, G, W). Douglas Co.: Sandberg & Leiberg 340 (E, G, W). Kittitas Co.: Cotton 1363 (G, W). Stevens Co.: Kreager 474 (G, W); Lyall s.n. [Cascades Mts. to Ft. Colville, 1860] (G). Whitman Co.: Elmer 324 (E). Yakima Co.: Vasey 468 (G, W). OREGON: Clackamas Co.: E. P. Sheldon 8856 (E, W). Morrow Co.: J. W. Thompson 4880 (E, G, W). Umatilla Co.: H. E. Brown 58 (E, W); Griffiths & Hunter 18 (W); Leiberg 902 (E, G, N, W). Wallowa Co.: E. P. Sheldon 8202 (E). Wasco Co.: Abrams 9487 (E); Engelmann s.n. [The Dalles, 2 Aug. 1880] (E). County undetermined: W. C. Cusick 1967 (E, G); E. Hall 393 (E, G). CALIFORNIA: Humboldt Co.: Abrams s.n. [Blue Lake, 1 April 1903] (E, N). Inyo Co.: Coville & Funston 953 (W). Los Angeles Co.: Abrams 2574 (E, G). Monterey Co.: Bolander 426 (G); Vasey 512 (W). Orange Co.: D. L. Crawford s.n. [Laguna Canyon, 26 July 1916] (E). San Bernardino Co.: Parish & Parish 2171 (W). Tulare Co.: Palmer 2699 (W). MEXICO: Baja California: C. R. Orcutt 1228 (E), 1546 (E), 1549 (E), s.n. [Tia Juana] (F, W). Chihuahua: Gregg 433 (E); Stearns 7 (F, W). Coahuila: Gregg 623 (E), 636 (E); Edw. Palmer 1048 (D, G, W); Purpus 4524, in part (W). Sonora: Kennedy 7032 (W). CULTIVATED: Spain: Herb. Bot.

Gard. Madrid s.n. (E--photo of type).

In all, I have examined 2293 herbarium specimens of this species, including the type collections of most of the names involved.

Citations: CANADA: ONTARIO: Lambton Co.: C. K. Dodge s.n. [Point Edward, 7-15-96] (Fc, Mi), s.n. [Pt. Edward, 7/8/97] (Au, Au, Mi, Ob--87445), s.n. [Point Edward, Aug. 12, 1914] (Mi, Mi); G. L. Fisher s.n. [Sarnia, July 10th, 1902] (S); Gaiser 2304 PE (Gp, Gp, Mm), 2517 PE (Gp, Gp, Mm); Gaiser & Montgomery 2237 PE (Gp, Gp, Mm); J. Macoun 54635 (N). Middlesex Co.: Dearness & Colgrove s.n. [northeast of Strathroy, 31st August 1934] (Mg). County undetermined: W. Dearness 84 (Mg). MANITOBA: Crystal City: G. Thomas s.n. [Crystal City] (Wp). Lyleton: Scoggan 10009 (Vi, Wp). Melita: Scoggan 9887 (S, Vi, Wp). Ninga: Sage s.n. [Ninga] (Wp). SASKATCHEWAN: Gainesborough: J. I. S. Reynolds CS.261 (Ew). Kyle: R. C. Russell CS.590 (S). Maple Creek: Boivin & Perron 12135 (N); J. A. Campbell 95 (Mn—35075). ALBERTA: Lethbridge Co.: Macoun 24268 (N). Macleod Co.: E. H. Moss 204 (N). Medicine Hat Dist.: Boivin & Alex 9477 (N). North Vattleford Co.: Breitung 15643 (N, N). County undetermined: Degener & Degener 25650 [Frank] (N, W). BRITISH COLUMBIA: Cariboo Co.: Macoun s.n. [Kamloops, June 13th, 1889] (C). Yale Co.: Macoun 76775 (N); J. W. Thompson 11909 (Cm), 14374 (Ba, Ca—882591, Gg--310864, It, N, Se--20142, Se—57749). UNITED STATES OF AMERICA: VERMONT: Chittenden Co.: Muenscher, Manning, & Maguire 494 (Vt). Windsor Co.: J. P. Poole s.n. [West Hartford, 8/12/1946] (Dt). County undetermined: Herb. Carpenter s.n. (Vt). CONNECTICUT: Fairfield Co.: Eames 8137 (N); Jansson s.n. [Shelton, June 23, 1928] (Go). Hartford Co.: Jansson s.n. [Bristol, July 12, 1945] (Go). NEW YORK: Chemung Co.:S. G. Smith 2620 (N). Dutchess Co.: H. Ahles 726 (Aa). Monroe Co.: Beckwith 15 (Al). Queens Co.: A. Brown s. n. [Hunter's Point, Aug. 2, 1879] (Tc). Rensselaer Co.: C. H. Peck s.n. [West Troy] (Al); Puissant s.n. [West Troy, Aug. 30, 1870] (Al, Br). Saratoga Co.: H. D. House 29411 (Al, Au, Au, B, Ca—882600, N, Ok, Ur); O. P. Phelps s.n. [July 24, 1925] (Al). Suffolk Co.: E. J. Alexander s.n. [Montauk Point, Aug. 20, 1933] (N); H. N. Moldenke 11382 (N). Barren Island: Monachino 122 (Bt—35372, Dp, H--40668, I, Io—145160, Ka--90369, N, Ok, Um—251, Up, Ur), s.n. [Aug. 4, 1936] (N). NEW JERSEY: Hudson Co.: Van Sickle s.n. [Weehawken, July 20, 1894] (Tc). Sussex Co.: Ahles 914/48 (Ur); Clausen & Edwards 3538 (Ba). PENNSYLVANIA: Delaware Co.: Fogg 5299 (Up). Philadelphia Co.: I. Burk s.n. [Girard Point] (Up--17095); Diffenbaugh s.n. [Navy Yard, June 9, 1866] (Up—17092); Fogg 9870 (Up); C. F. Parker s.n. [July 28, '77] (Pr), s.n. [July 25/78] (Pr). Wyoming Co.: Glowenke 11298

(Ur). DISTRICT OF COLUMBIA: Mrs. L. M. Jenkins s.n. [Washington, July 1911] (Up--58797). VIRGINIA: Accomac Co.: H. A. Gleason 8547 (N). Giles Co.: R. Bebb 1687 (Ok). Southampton Co.: A. A. Heller 1012 (C, Mm--15394, Up--17088). WEST VIRGINIA: Hampshire Co.: E. L. Core 4391 (We); Frye 1198 (We). Monongalia Co.: Davis & Davis 7180 (We). Pocahontas Co.: West Va. Univ. Bot. Exped. 1039 (We). NORTH CAROLINA: Clay Co.: Huger 18 (N). Forsyth Co.: P. O. Schallert 11832 (No--23996). Iredell Co.: M. E. Hyams s.n. (Du--24161). McDowell Co.: LeRoy & Ruger s.n. [Foot Black, June 1872] (N). GEORGIA: Bibb Co.: J. K. Small s.n. [July 8-9, 1895] (C). Catoosa Co.: J. K. Small s.n. [August 6-12, 1895] (C). Charlton Co.: E. M. Hall 511 (N). Clarke Co.: K. M. Drewry E.1988 (Up); Mrs. K. M. Drewry s.n. [Aug. 25, 1929] (Gu--E.1988); W.H. Duncan 7745 (Gu). DeKalb Co.: J. K. Small s.n. [Stone Mountain, July 1--6, 1895] (C, Io--20750, S). Fulton Co.: T. P. Cleveland s.n. [Atlanta, 1860] (Fl--21086). Gwinnett Co.: H. A. Allard 207 (N). Hancock Co.: Cuthbert s.n. [Mayfield, May 1903] (Fl--21087). Jefferson Co.: H. M. Hopkins s.n. (N). Muscogee Co.: Boykin s.n. [Columbus] (C); Saurman s.n. [Columbus] (Pr, Up--17098). Screven Co.: J. M. Reade s.n. [May 18, 1928] (Gu--E.8353). FLORIDA: Franklin Co.: Chapman s.n. [Biltmore Herb. 1082b] (N), s.n. [Apalachicola] (C). County undetermined: Buckley s.n. (Io--15342); Chapman s.n. [Florida] (C). ALABAMA: DeKalb Co.: Ruth 495 (N). Etowah Co.: Eggert s.n. [8 July 1898] (N); Vasey s.n. [Gadsden, 1878] (Pr, Vt). Lee Co.: C. F. Baker 914 (C); Earle & Baker s.n. [Auburn, 10 May 1896] (Cm), s.n. [Auburn, 5/13/1898] (Cm, Mi, Po--63897, Ur, Vt); Earle & Underwood s.n. [Auburn, 20 May 1896] (C). Tuscaloosa Co.: Pollard & Maxon 333 (Gu--E.7022, N). Wilcox Co.: Buckley s.n. [May 1840] (T). County undetermined: Rugel s.n. [Alabamam mediam, Sept. 1843] (Br, Ca--80478, Go, M). OHIO: Butler Co.: Demaree 27351 (N, Qu); J. Ferguson s.n. [July 6, 1932] (Ob--80591). Hamilton Co.: Aiken 10676 (Ll); E. L. Braun s.n. [6/12/06] (Cn, Cn); C. G. Lloyd 1962 (Mi), s.n. [July 9, 1881] (Al), s.n. [July 12, 1883] (Go). Lake Co.: H. C. Beardslee s.n. [June 7th, 1871] (Ob--80592). Richland Co.: Moseley s.n. [8/24/24] (Ob--97292). ILLINOIS: Adams Co.:Evers, Jones, & Jones 1207 (Il--25614, Ur); A. B. Seymour s.n. [Camp Point, Aug. 4, 1877] (H--106598), s.n. (Ur--14175). Alexander Co.: H. M. Franklin 62 (Ur); Winterringer 3137 (Il--28358). Bureau Co.: Winterringer 7996 (Il--37244). Carroll Co.: Ahles 4322 (Ur); Winterringer 2770 (Il--28112). Champaign Co.: Ahles 6299 (Ur, Ur), 6300 (Ur, Ur); M. H. Bell 131 (Ur); G. N. Jones 11815 (Ur), 12457 (Il--15845, N, Ur), 16465 (Ur); Stubbs 87 (We); Winterringer 4022 (Il--29322). Cook Co.: H. H. Babcock 9254 (Bz--23748), s.n. [Hyde Park, June 19, 1871] (N), s.n. [Jul.

18, 1874] (Sg—16115); L. H. Bailey s.n. [Chicago, July 27, 1880] (Ba); H. R. Bennett s.n. [July 6, 1957] (Go); M. A. Chase 1570 (Ur, Ur); Collector undesignated s.n. (Cn); G. D. Fuller 1645 (Il—15852), 11205 (Il—19417); Lansing 2616 (Ur), 2616 bis (Ur); H. N. Patterson s.n. (Bz—23749). DeKalb Co.: G. N. Jones 17260 (Ur). DuPage Co.: W. S. Moffatt 383 (Ur), s.n. [Warrenville, July 11/93] (Ur); Moffatt & Moffatt 348 (Ur). Fayette Co.: A. Hoffman 191 (Dt). Hancock Co.: Mead 1842 (Tl), s.n. [Augusta, 1842] (Vt). Henderson Co.: H. N. Patterson s.n. [July 1877] (Cm). Iroquois Co.: Winterringer 6462 (Il—33754). Jackson Co.: G. D. Fuller 319 (Ur); Fuller & Welch 319 (Il—15849). Jo Daviess Co.: Ahles 4366 (Ur). Kane Co.: Sherff 1797 (Ur). Kankakee Co.: E. J. Hill 71. 1871 (Ur). Lake Co.: R. K. Brown s.n. [July 9, 1949] (Ur); Umbach 5812 (Ca—441524), 6562 (N). LaSalle Co.: Kofoid s.n. [Aug. 12, 1889] (Ob—50780). Lawrence Co.: Sivert s.n. [July 25, 1952] (Ur). Lee Co.: Keithley 113 (Il—15844), s.n. [June 23, 1943] (Ur). Livingston Co.: G. N. Jones 18955 (Ur). Macon Co.: R. G. Mills s.n. [July 3, 1944] (Ur); Weigel s.n. [July 24, 1950] (Ur). Mason Co.: Ahles 2010 (Ur), 4068 (Ur); Burrill & Clinton s.n. [Havana, June 22, 1894] (Ur); H. A. Gleason 9183 (N), s.n. [Havana, Aug. 18, 1904] (Io—176180). McDonough Co.: G. N. Jones 22408 (Ur). McHenry Co.: V. H. Chase 9524 (Ur); Nason s.n. [Algonquin, August 2, 1878] (Ur), s.n. [Aug. 23, 1912] (Il—20859); Vasey 30013 (Ur), s.n. [Ringwood] (Pa, Up—17090). McLean Co.: G. D. Fuller 173 (Il—15847). Menard Co.: E. Hall s.n. [Athens, July 1863] (Pa). Monroe Co.: Winterringer 3921 (Il—29051), 3955 (Il—29021). Morgan Co.: Winterringer 5252 (Il—35416). Ogle Co.: A. L. Hills 3630-0 (Il—15843); Waite s.n. (Ur—14176). Peoria Co.: V. H. Chase 9707 (Ur, Ur), 14548 (Ur); M. Fisher s.n. [6-13-1880] (Ka); Heading s.n. [1875] (Ur); F. E. McDonald s.n. [Peoria, June 1887] (Ur), s.n. [Peoria, July 1890] (Ca—67681), s.n. [Peoria, June 1903] (N), s.n. [Peoria, Jul. 1903] (Gg—31304), s.n. [Peoria, Aug. 1913] (La, Um—240, S). Randolph Co.: V. A. Anderson 15196 (Il—31496). Richland Co.: Scherer 316 (Il—26357, Ur). Rock Island Co.: G. D. Fuller 13805 (Il—31344); H. N. Moldenke 7656 (N). Saint Clair Co.: Eggert s.n. [East St. Louis, June 11, 1879] (Au, Ca—181583, Cm, Io—79813, Mn—6884, Po—161455, Up—60753); J. Neill 311 (Il—23391). Sangamon Co.: G. D. Fuller 5086 (Il—15846), 5105 (Il—15848), 8795 (Il—16015, Ur). Shelby Co.: Batson s.n. (N); G. D. Fuller 13123 (Il—23793). Stark Co.: V. H. Chase s.n. [July 11, 1896] (Ur), s.n. [Aug. 26, 1897] (Ur). Stephenson Co.: C. F. Johnson s.n. [Freeport, July 30, 1898] (N). Tazewell Co.: V. H. Chase 1112 1/2 (Ur), 11123 1/2 (Ur), 13539 (Au—123201); Churchill s.n. [E. Peoria, June 9, 1912] (Ba). Ver-

million Co.: W. S. Moffatt s.n. [Danville, Aug. 3, '89] (Ur). Wabash Co.: Schneck s.n. [June 15, 1879] (Ur), s.n. [July 8, 1880] (Ur), s.n. [Aug. 6, 1888] (Ur); Shearer 191 (Dt), s.n. [June 10, 1900] (La), s.n. [Mount Carmel, July 4, 1900] (Ur, Vi). Whiteside Co.: Ahles 4264 (Ur). Winnebago Co.: M. S. Bebb s.n. [Fountaindale, 1871] (Dt, Pa); R. Bebb s.n. [Spring 1879] (Ok); Fell & Fell F.46358 (Il--21234); Fuller & Haime 248f (Il--15851), 2528h (Il--15850). Woodford Co.: V. H. Chase 9697 (Ur). County undetermined: Collector undesignated s.n. (Gg--31297); Marie-Victorin 6914 (Vi); Seymour s.n. [1881] (Sd--4251); Underwood s.n. [Auna, June 1882] (Cp); Vasey 6 (Il--16005), s.n. (Pr). INDIANA: Bartholomew Co.: C. C. Deam 36915 (Dm); Friesner 19217 (Au). Cass Co.: Ek s.n. [near Logansport, 8-25-1942] (Bt--64072). Clark Co.: J. F. Baird s.n. [Charlestown, 5-30-77] (Mi). Crawford Co.: C. C. Deam s.n. [July 12, 1899] (Dm). Daviess Co.: H. J. Clements s.n. [7/31/95] (Pu); C. C. Deam 25582 (Dm). Elkhart Co.: C. C. Deam 34430 (Dm), 66163 (No--19967); Ek s.n. [July 27, 1942] (Dp--33216), s.n. [Goshen, 9-1-1942] (Bt--63357); H. N. Moldenke 7559 (N). Fountain Co.: C. C. Deam s.n. [June 5, 1905] (Dm). Fulton Co.: C. C. Deam 39234 (Dm); Friesner 13937 (Bt--47968, Fn--1656). Gibson Co.: C. C. Deam 43828 (Dm). Grant Co.: Ek s.n. [8-15-1938] (Bt--56919). Hendricks Co.: G. W. Wilson s.n. [Danville, Aug. 1895] (Dp). Howard Co.: Ek s.n. [6-16-1939] (Bt--49325). Jasper Co.: C. C. Deam 42087 (Dm); Friesner 14593 (Bt--50734); W. H. Welch 124 (Ur), 204 (Dp), s.n. (In--6176). Jefferson Co.: C. C. Deam 13409 (Pu); A. H. Young s.n. [Hanover, 1875] (In--10225, Pr). Knox Co.: C. C. Deam 54330 (Dm); Lipps s.n. [August 28, 1941] (Ok); S. McCoy 1906 (Dp--4669), s.n. [near Bruceville, 6-3-34] (Bt--18428). Kosciusko Co.: C. C. Deam 5132 (Dm); Friesner 19249 (N, Ob--201452, Ok, St). Lagrange Co.: C. C. Deam 14934 (Dm); Friesner 15977 (Bt--54044, N); Weatherwax s.n. [Ontario] (In--3666). Lake Co.: M. A. Chase 100 (Ur); Umbach s.n. [Lake Station, June 6, 1896] (N, N), Laporte Co.: C. C. Deam 53971 (Dm); W. S. Moffatt 1685 (Se--95718, Ur); C. P. Smith s.n. [July 24, 1904] (Mi). Lawrence Co.: Kriebel 3098 (H--56280); Wible 72 (In--4584). Madison Co.: C. R. Barnes s.n. [Madison, 6/18/77] (Pu). Miami Co.: Ek s.n. [6-14-1942] (Bt--63700, Pl--132302, We). Monroe Co.: F. C. Anderson s.n. [Bloomington] (In--1729); Lewis & Brown s.n. [East Pike, July '06] (Au). Montgomery Co.: W. Rhoades 971 (Bt--14479, Dp--4668). Newton Co.: C. C. Deam 50589 (Dm). Noble Co.: C. C. Deam 14690 (Dm); Van Gorder 139 (Pu). Perry Co.: C. C. Deam 25057 (Dm). Posey Co.: C. C. Deam 43500 (Dm); W. H. Welch 6899 (Bl--42290, Ca--882597, Dp--14065, Ky, We). Pulaski Co.: C. C. Deam 29861 (Dm); Friesner 14473 (Bt--50777). Putnam Co.: Friesner 17832 (Bt--67504,

Mi); Grimes 671 (Dp); Yuncker 10480 (Ca--744097, Dp--14453). Starke Co.: S. McCoy 4199 (Dp--13912); W. H. Rhoades s.n. [Knox, July 1932; Moldenke 17078] (Bt, Hs, N, St), s.n. [near Knox] (Hs). Steuben Co.: C. C. Deam 1272 (Dm, Mi, N, N); Friesner 6071 (Bt--13377, Bt--13380, Bt--13382, Ca--540454), 15717 (Bt--55228, Ca--882598). Tippecanoe Co.: H. J. Clements s.n. [8/17/96] (Pu); C. C. Deam 17735 (Dm), s.n. [June 23, 1901] (Dm); Dorner 205 (Pu); Ek s.n. [June 10, 1942] (Bt--63542, Dp--32006); Friesner 22856 (S); Herb. Purdue Univ. s.n. [7/29/91] (Pu). Vermillion Co.: C. C. Deam 11910 (Dm). Warren Co.: Umbach s.n. [Pine, June 29, 1898] (Ka--62598). White Co.: M. McKee 141 (Dp). County undetermined: Grimes 2160 (Dp). IOWA: Allamakee Co.: A. Hayden 5019 (Io-148804). Benton Co.: Folck s.n. [Sept. 15, 1932] (Io--139569). Black Hawk Co.: Burk 542a (Ur). Boone Co.: Pammel, Buchanan, & King 3882 (Io--31762). Buchanan Co.: Bode s.n. [Lamont, Aug. 13, 1919] (Io--97035). Carroll Co.: L. H. Pammel s.n. [Carrollton, Jul. 21, 1919] (Io--93962). Cerro Gordo Co.: L. H. Pammel s.n. [Wheelerwood, Sept. 20, 23, 1902] (Io--82424). Chickasaw Co.: Rolfs s.n. [Lawless, 1890] (Io--15318); Spiker s.n. [1925] (Io--118281). Dickinson Co.: Conard s.n. [July 4, 1923] (Se--19992); W. B. Fox 2 (We). Dubuque Co.: Mertz s.n. [Aug. 18, 1871] (Cm), s.n. [Dubuque, Aug. 15, 1877] (Vt). Emmet Co.: Wolden 437 (Io--105473), s.n. [July 16, 1930] (Go). Fayette Co.: Fink s.n. [Fayette, Aug. 1893] (Io--28697), s.n. [Fayette, July 30, 1894] (Io-26814). Greene Co.: J. B. Hatcher s.n. [Cooper] (Ca--25179). Guthrie Co.: L. H. Pammel 562 (Io--118733). Hamilton Co.: Pammel & Zimmerman 300 (Io--118096). Hardin Co.: L. H. Pammel s.n. [Steamboat Rocks, 9-12-12] (Io--52668). Henry Co.: J. H. Mills s.n. [Mt. Pleasant, 1897] (Io--15315). Iowa Co.: Shimek s.n. [July 2, 1903] (Ur). Johnson Co.: Anderson & Harrington s.n. [May 30, 1932] (Bt--58018); Fitzpatrick & Fitzpatrick s.n. [8-17-1901] (Dm); A. S. Hitchcock s.n. [Iowa City, 6/8/89] (Io--15311). Lee Co.: Fults 1416 (Io--138969). Linn Co.: Treat s.n. [Lisbon, June 1865] (Ms). Mahaska Co.: Augustine 397 (Ok, Ok). Marshall Co.: L. H. Pammel s.n. [Marshalltown, Jul. 13, 1929] (Io--134205, Io--134228). Muscatine Co.: Shimek s.n. [June 28, 1913] (Ur), s.n. [Sept. 2, 1922] (N). Pottawattamie Co.: Demaree 23679 (Sm). Story Co.: Arthur s.n. [Ames, June 12, 1871] (Ah, Ah), s.n. [Ames, July 17, 1877] (Ah, Ah, Cm); C. R. Ball 86 (Fc, Fl--21088, Fl--21090, Io--15316, N); C. E. Bessey s.n. [Ames] (Io--15310); Carver s.n. [Ames, 1894] (Io--15314), s.n. [Ames, 1895] (Ioo--15313); P. Clayton 9 (Io--84551), 34 (Io--84552); Cratty s.n. [Ames, Jul. 29, 1925] (Io--117331); J. B. Elder 365 (St); H. S. Fawcett 12 (Fl--21090, Io--76853, N); A. Hayden 340 (Au, Io--142437, N), s.n. [October 15, 1934] (N, N); Herb. Iowa

State Coll. 76544 (Io); A. S. Hitchcock s.n. [Ames, June 1882] (Io--15312), s.n. [Ames, 1889] (Io--15317); L. H. Pammel s.n. [Ames, 1909] (Io--76463), s.n. [Ames] (Io--20752, Io--57765); W. A. Weber 431 (Bl--48182, Io--152969), 723 (Bl--48181). Union Co.: T. L. Andrews s.n. [Creston] (Io--22908). Webster Co.: Blumer 4443 (Io--107694); Paige s.n. [Fort Dodge] (Io--131041); Somes s. n. [7/27/05] (Bl--42295). Winneshiek Co.: Goddard s.n. [Decorah, 6-1-95] (Io--72021); Holway s.n. [Decorah, Aug. 1, '79] (Io--92225), s.n. [Decorah, June 14, 1881] (Io--38751); Tolstead s.n. [Decorah, July 10, 1933] (Ca--882594, Ew), s.n. [Aug. 4, 1933] (Io--144285). County undetermined: Suksdorf s.n. [July 26, 1873] (Pl--138429). KENTUCKY: Anderson Co.: Wildburger 1962 (Ka). Hickman Co.: Anderson & McFarland 230 (Ky, Vi); McFarland & Anderson 230 (S). Jefferson Co.: Gun J.189 (N); C. W. Short s.n. [Louisville] (Ll, Pr). Union Co.: Shacklette 500 (Ky). County undetermined: C. W. Short s.n. [west of Kentucky, 1831] (T), s.n. [sandy banks of the Ohio & Salt Rivers, Sept. 1835] (Ky--1778), s.n. [1854] (Ca--379995); Snow s.n. (S). TENNESSEE: Blount Co.: Ruth 3260 (N). Cheatham Co.: C. S. Williamson s.n. [Kingston Springs] (N). Decatur Co.: G. L. Ames s.n. [May 9, 1855] (Mi). Hamilton Co.: Collector undesignated s.n. [Chattanooga, Aug. 1868] (Pr). Humphreys Co.: Galloway s.n. [June 8, 1889] (Ob--50783). Montgomery Co.: T. L. Anderson s.n. [Clarksville, 1846] (Io--32956). Obion Co.: Jennings & Jennings s.n. [Reelfoot Lake, 1924] (Cm, Cm). County undetermined: G. B. Grant 2810 (Po--267640); Nason s. n. [May 9, 1855] (Ur). MICHIGAN: Allegan Co.: F. T. McFarland s. n. [Douglas Lake, Aug. 15, 1915] (Ky). Cass Co.: F. C. Gates 1321 (Mi). Cheboygan Co.: J. H. Ehlers 472 (Mi), 627 (Mi), 1771 (Mi); F. C. Gates 13222 (Ka--66182); M. McKee 613 (Dp). Dickinson Co.: C. A. Davis s.n. [Norway, July 24, '05] (Mi); Fernald & Pease 3495 (Mi). Emmet Co.: E. G. Voss 2420 (Mi). Houghton Co.: C. D. Richards 2710 (Mi). Iosco Co.: C. A. Davis s.n. [Oscoda, Sept. 3, 1902] (Mi). Keweenaw Co.: F. J. Hermann 509 (Mi). Leelanau Co.: Hanes s.n. [Paul's, Aug. 11, 1953] (Mi). Livingston Co.: D. Lynch s.n. [September 9, 1947] (Au--121789). Menominee Co.: Grassl 2620 (Mi, N). Montcalm Co.: Bazuin 5746 (Mi). Muskegan Co.: Bazuin 8007 (Mi). Ottawa Co.: J. S. Douglas s.n. [Grand Haven, 1870] (Ws); Mulliken & Cole s.n. [Grand Haven, Aug. 11, 1896] (Mi). Saint Joseph Co.: Hanes s.n. [Three Rivers Park, Aug. 22, 1954] (Mi). Van Buren Co.: W. H. Rhoades s.n. [between Papaw and Kalamazoo] (Hs). Wayne Co.: Parker s.n. [Fort Gratiot, 1829] (C). County undetermined: F. D. Kelsey s.n. [August 6, 1899] (Ob--50778). WISCONSIN: Adams Co.: R. T. Brown 116 (Ws); H. H. Iltis 13356 (Ws). Brown Co.: Gillman s.n. [Aug. 4, 1871] (Pr); Shinners 3801 (Ca--882593, Ws). Buffalo Co.: Iltis & Neess 9352 (Ws); Il-

tis & Noamesi 8136 (Ws). Columbia Co.: C. C. Albers 34010 (Au); H. P. Chandler 374 (Ca--25178); Marx s.n. [6/3/58] (Ws); F. C. Seymour 10279 (Ws). Crawford Co.: Fassett 9789 (Ws); D. Houghton s.n. [Prairie du Chien, Aug. 1831] (Mi); H. H. Smith 7455 (B, Ws). Dane Co.: C. C. Albers 36007 (Au); Bergseng s.n. [Madison, July 7, 1946] (Ws); Bokde, Kempen, & Gabert s.n. [June 9, 1957] (Ws); R. Burton 123 (Ws); Cull 6924 (Ws); T. J. Hale s.n. [Madison] (Ws); Heddle 706 (Ws), 2477 (Ws), 2574 (Ws); S. H. Watson s.n. [Madison] (Pa). Dunn Co.: E. A. Baird s.n. [Caryville, Aug. 15, 1920] (Ws); Buss s.n. [Falk City, July 8,,1940] (Ws). Grant Co.: Busch 25 (Ws). Green Co.: G. Cottam 54 (Ws); E. W. Fell 58-729 (Ws); J. W. Thomson s.n. [south of Albany, September 25, 1949] (Ws). Green Lake Co.: Hein 65 (Ws); Shinners 1 (Ws). Iowa Co.: Clikeman, Drescher, Gisvold, & Leiderman s.n. [Blue Mounds, June 10, 1932] (Ws). Jackson Co.: Grether 6585 (Ws), 7194 (Ws); H. H. Smith 6835 (B). Jefferson Co.: P. O. Schallert 8451 (H--5404). Juneau Co.: J. W. Thomson s.n. [Armenia, Aug. 18, 1938] (Ws); Wills s.n. [Camp Douglas, June 25, 1957] (Ws). Lacrosse Co.: Hartley 2929 (Ws); A. M. Peterson 223 (Ws). Lafayette Co.: L. S. Cheney s.n. [Fayetteville, Aug. 27, 1888] (Ws); P. K. Nelson s.n. [Darlington, July 22, 1946] (Ws). Lincoln Co.: Peroutky s.n. (Ws); F. C. Seymour 11442 (Ws). Marathon Co.: L. S. Cheney 3286 (Ws). Marinette Co.: J. W. Thomson s.n. [Camp Bird, July 13, 1946] (Ws). Marquette Co.: Grotjan 156 (Ws); Iltis, Bell, Melchert, Patman, & Witt 12369 (Ws); Iltis, Trenk, & Noamesi 6163 (Ws); Koeppen 382 (Ws). Milwaukee Co.: J. S. Douglas s.n. [Wis.] (Je--3152); Shinners s.n. [Milwaukee, Oct. 2, 1937] (Ws). Pepin Co.: Kinney s.n. [Sept. '96] (Ob--99769). Pierce Co.: Weinzirl s.n. [River Falls, Sept. 3, '92] (Ws). Portage Co.: F. W. Stearns 797 (Ws); W. R. Taylor 2808 (Up--75579); J. W. Thomson s.n. [Arnott, Aug. 24, 1938] (Ws). Racine Co.: J. J. Davis s.n. [Racine, July 7, 1879] (Ur, Ws); Wadmond s.n. [7/7/8] (Al). Richland Co.: M. A. Fosberg 335 (Ws). Rock Co.: R. B. Anthony s.n. [Bebit, June 19, 1934] (Ws); E. W. Fell 57-652 (Ws), 57-741 (Ws); Skavlene s.n. [Janesville, June 27, '89] (Ws). Sauk Co.: C. C. Albers 33019 (Au, Au, Au), 33020 (Au); Fassett 2687 (Ws); Greene & Curtis 8093 (Ws); True s.n. [Greenfield, July 3] (Ws). Sheboygan Co.: Goessl s.n. [Plymouth, Aug. 1914] (Ws). Trempealeau Co.: Hartley 372 (Ws); F. J. Hermann 8954 (N, Ws). Vernon Co.: J. B. Marks s.n. [Coon Valley, 1939] (Ws). Walworth Co.: Almon s.n. [East Troy, July 4, 1926] (Ws); H. C. Benke 6077 (N); Blatchford s.n. [July 19, 1875] (Ca--882595, N); Kleeberger s.n. [Whitewater, June 7, 1878] (Gg--31300); J. W. Thomson s.n. [Lake Geneva, Aug. 5, 1940] (Ws); Wadmond 3765 (Ky),

13034 (S, Ws). Waukesha Co.: Lapham s.n. [Ottowa & Genesee, Aug. 11th, 1847] (Ws), s.n. [Eagle] (Ws); R. W. Pohl P.1203 (Bt--50492, Cm, Mi, Ws). Waupaca Co.: Rill s.n. [July 19, 1959] (Ws). Waushara Co.: Bartlett & Richards 952 (Mi); Pochmann s.n. [Sept. 4, '58] (Ws). County undetermined: Univ. Wisc. Econ. Coll. s.n. [Wanwatosa, July 18, 1890] (Ws). MINNESOTA: Anoka Co.: Cratty s.n. [Anoka, Aug. 20, 1918] (Io--96199). Crow Wing Co.: A. B. Seymour s.n. [Brainerd, Aug. 22, 1884] (H--106467); E. B. Watson s.n. [Brainerd, 8-4-1902] (Io--45775). Goodhue Co.: J. H. Sandberg s.n. [Red Wing, July 1885] (S). Hennepin Co.: G. B. Aiton 982 (Ur, Ur), s.n. [Aug. '90] (Dt); Buell 551 (H--58006, No--8604); F. H. Burglehaus 8455 (Se--14961); E. J. Hill 269.1889 (Ur); Ramaley 420 (Bl--42284); J. H. Sandberg 267 (Fc--2279, Io--44135, Ka), s.n. [Aug. 1889] (Ca--25141). Jackson Co.: Cratty s.n. [Jul. 24, 1923] (Io--109581). Mille Lacs Co.: E. P. Sheldon s.n. [Princeton, July 1892] (N, S). Ottertail Co.: Chandonnet s.n. [July 14, 1910] (Dm). Ramsey Co.: F. Blanchard s.n. [St. Paul, July 31, 1890] (Dt); Saint Lawrence 24 (N). Rice Co.: G. K. Knight s.n. [Northfield] (Bt--31378). Rock Co.: H. A. Gleason 9394 (N). Stearns Co.: R. Gmelin s.n. [St. Cloud, Aug. 1875] (Io--94752); E. B. Watson s.n. [St. Cloud, 7-16-02] (Io--82404). Winona Co.: Holzinger s.n. [July 1901] (N, Vt). Wright Co.: Jesup 1962 (Dt). NORTH DAKOTA: Benson Co.: Bolley s.n. [Leeds, Aug. 14, 1891] (La); Lunell s.n. [Leeds, July 2nd, 1898] (Dt), s.n. [Leeds, July 24th, 1898] (Ur), s.n. [July 12, 1904] (Ok), s.n. [Leeds, July 24, 1906] (Du--77581, S), s.n. [Butte, July 28, 1907] (Dm, N), s.n. [Leeds, July 22, 1909] (Ur), s.n. [October 16, 1916] (Dm). Billings Co.: Facey 98 (Au--121808). Bottineau Co.: Boivin & Dore 8198 (N). Burleigh Co.: F. P. Metcalf 366 (Gg--31311). Cass Co.: Bergman & Stevens s.n. [Fargo, July 19, 1910] (Ca--587762, Cm). Stark Co.: Holgate s.n. [Aug. 14, 1908] (Gg--31306, N, Pl--103657). County undetermined: Brenckle 2282 (Dm). SOUTH DAKOTA: Brookings Co.: F. C. Gates 16647 (Ka--81020); E. C. Pammel s.n. [Brookings, July & Aug. 1902] (Io--22907). Brule Co.: E. N. Wilcox s.n. [Chamberlain, July 1893] (Ob--50772). Butte Co.: F. L. Bennett 618 (Gg--310863). Custer Co.: Degener & Peiler 16061 (N, Si); Jones & Jones 10657 (Ur); Over s.n. [June 19, 1914] (Se--14959). Deuel Co.: C. & W. 348 [Herb. Corbett 1039] (We); T. A. Williams s.n. [Clear Lake, 20 August 1894] (N). Fall River Co.: Whitham s.n. [Hot Springs, Sept. 15th, 1909] (Io--50180). Hanson Co.: G. F. Weber s.n. [Farmer, 8-18-27] (Fl--21085). Hughes Co.: L. Adams s.n. [6/27/94] (Ur). Lawrence Co.: W. P. Carr 179 (Vi), s.n. (Vi--6012); C. M. King s.n. [Spearfish Canon, Aug. 1916] (Io--74097); Rydberg 934 (N). Lyman Co.: Over s.n. [July 14, 1914] (Se--14956). Meade Co.: A. D. Pratt s.n. [Piedmont, June

1895] (Ob—50782, S). Pennington Co.: Enander s.n. [1-4/9/1921] (S); J. W. Leedy 431 (Bt—55627). Roberts Co.: Over 14387 (Du—146412). Shannon Co.: Visher 2028 (N). Spink Co.: Brenckle 39-64 (Sd—26485), 39-74 (N); Petrak s.n. [20.VII.1950] (S); A. E. Ricksecker 66 (Ca—475503, Ob—50781, Po—215249, Po—215263, Um-244, Ur). Todd Co.: Tolstead 4-527 (Io—145162). Turner Co.: Fessenden s.n. [Hurley] (Io—70756). County undetermined: O. M. Clark 6059 (B); Petrak 50072 [Badlands National Park] (N), s.n. [Bad Lands, 3.VIII.1950] (S). KANSAS: Allen Co.: A. S. Hitchcock s.n. [Allen Co., July 1896] (Ka). Atchison Co.: Clothier & Whitford s.n. [Aug. 2, 1897] (Ka); A. S. Hitchcock s.n. [Atchison Co., Oct. 3, 1896] (Ka); Jeanette 162 (N). Barton Co.: A. S. Hitchcock s.n. [Barton Co., August 1895] (Ka). Bourbon Co.: Z. D. Thompson 547 (Lw). Butler Co.: A. S. Hitchcock s.n. [White Water, July 1892] (Ka); D. J. Johnson s.n. [July 1926] (Ka—71718). Chautauqua Co.: A. S. Hitchcock s.n. [Aug. 8, '96] (Ka); W. H. Horr s.n. [July 5, 1930] (Lw). Cherokee Co.: A. A. Jacobs 102 (Ka—74038); Kellerman s.n. [Galena, July 8, 1887] (Ka). Cheyenne Co.: F. C. Gates 16835 (Ka—76132); Steller & Jacobs 337 (N); N. White s.n. [June 16, 1931] (Ka—77629). Clark Co.: A. S. Hitchcock s.n. [Minneola, July 1892] (Ka). Clay Co.: Imler s.n. [June 8, 1929] (Lw); J. B. S. Norton s.n. [Wakefield, June 1891] (Ka). Cloud Co.: Carleton s.n. [Warren, July 30, 1883] (Ur); S. V. Fraser 441 (Ka—79079). Cowley Co.: Rydberg & Imler 484 (Ka—74607, Lw). Crawford Co.: C. L. Merritt s.n. [Spring 1941] (Ka—93368). Decatur Co.: Kellerman s.n. [Oberlin, July 11, 1888] (Ka); R. L. McGregor 2116 (Lw). Dickinson Co.: A. S. Hitchcock s.n. [Dickinson Co., June 1896] (Ka); Imler s.n. [6/8/29] (Lw). Doniphan Co.: Clothier & Whitford s.n. [July 31, 1897] (Ka). Douglas Co.: Z. D. E. Brown s.n. [July 6, 1896] (Ka); W. H. Horr E.570 (Ca—45083, Gg—396795, No—15637, Ok, S, St, Ur, Vi, We); R. L. McGregor 116 (Lw); Snow s.n. [August] (Fl—21092). Edwards Co.: A. S. Hitchcock s.n. [Edwards Co., Sept. 1, 1897] (Ka). Elk Co.: Clothier & Whitford s.n. [Aug. 20 & 21, 1897] (Ka). Ellis Co.: Bondy 269 (S), s.n. [June 7, 1935] (We), s.n. [August 19, 1935] (Go); A. S. Hitchcock s.n. [Ellis Co., July 1895] (Ka); Imler s.n. [May 12, 1928] (Lw). Ellsworth Co.: A. S. Hitchcock s.n. [Ellsworth Co., July 1895] (Ka). Finney Co.: Menke s.n. [Garden City, May 31, 1891] (Ka); Wilson & Miller s.n. [7-18-12] (Lw). Ford Co.: F. C. Gates 15973 (Ka—74161); A. S. Hitchcock s.n. [Bucklin, July 1892] (Ka). Geary Co.: F. C. Gates 17838 (Ka), 18696 (Ka); Gayle 511 (C); Imler s.n. [May 1929] (Lw). Gove Co.: A. S. Hitchcock s.n. [Gove Co., July 1895] (Ka); Inkenberry 6 (St—15962). Graham Co.: A. S. Hitchcock s.n. [Graham Co., June 20, 1897] (Ka). Grant Co.: C. H. Thompson 42 (N), 212 (Ka). Gray Co.: A. S. Hitch-

cock s.n. [Gray Co., Sept. 1, 1897] (Ka). Greeley Co.: J. P. Anderson s.n. [Aug. 26, 1908] (Io—53321); M. Reed s.n. [Tribune, July 29, 1892] (Ca—104826), s.n. [Tribune, Aug. 3, 1892] (Ka). Greenwood Co.: W. H. Horr s.n. [June 28, 1930] (Lw). Hamilton Co.: Clothier s.n. [May 17, 1898] (Ka); A. S. Hitchcock s.n. [Coolidge, July 4, 1892] (Ka); Rydberg & Imler 1008 (Lw). Harvey Co.: Clothier & Whitford s.n. [Aug. 24, 1897] (Ka); Doell 40 (Lw); Mrs. F. Muck 53 (S). Hodgeman Co.: A. S. Hitchcock s.n. [Hodgeman Co., August 1895] (Ka). Jackson Co.: Clothier & Whitford s.n. [July 28, 1897] (Ka). Jewell Co.: W. H. Horr 4394 (N); J. B. S. Norton s.n. [Webber, Sept. 23, 1895] (Ka). Johnson Co.: Clothier & Whitford s.n. [Aug. 7, 1897] (Ka). Kearney Co.: A. S. Hitchcock 1129 (Ka—79463, Ka, Mi, N), s.n. [Kearney Co., Aug. 29, 1897] (Ka). Kiowa Co.: Kellerman "a" (Ka). Labette Co.: Gwartney 5 (Ka-94531). Lane Co.: A. S. Hitchcock s.n. [Lane Co., August 1895] (Ka). Leavenworth Co.: A. S. Hitchcock s.n. [Leavenworth Co., May 1896] (Ka); W. H. Horr s.n. [6/23/30] (Lw); R. L. McGregor 828 (Lw). Lincoln Co.: A. S. Hitchcock s.n. [Lincoln Co., July 1895] (Ka). Linn Co.: A. S. Hitchcock s.n. [Pleasanton, Aug. 1892] (Ka). Logan Co.: A. S. Hitchcock s.n. [Logan Co., July 1898] (Ka). Marshall Co.: Clothier & Whitford s.n. [July 25, 1897] (Ka); Howell & Farrant s.n. [Oketo, Sept. 12, 1927] (Ka—71474). Mc Pherson Co.: A. S. Hitchcock s.n. [McPherson Co., July 1892] (Ka). Meade Co.: Kellerman s.n. [Meade Centre, June 27, 1888] (Ka). Miami Co.: Clothier & Whitford s.n. [Aug. 8, 1897] (Ka); Oyster s. n. [July 1885; Herb. Prager 18631] (Gg—31298). Mitchell Co.: H. V. Dwyer s.n. [July 1896] (Ka). Montgomery Co.: A. S. Hitchcock s.n. [Montgomery Co., August 1896] (Ka); W. H. Horr s.n. [July 5, 1930] (Lw). Morris Co.: A. S. Hitchcock s.n. [Morris Co., August 1895] (Ka); W. H. Horr s.n. [July 17, 1929] (Lw). Morton Co.: A. S. Hitchcock s.n. [Morton Co., August 1895] (Ka); J. N. Rose 17106 (La); Rose & Fitch 17106 (N). Nemaha Co.: Clothier & Whitford s.n. [July 27, 1897] (Ka); A. S. Hitchcock s.n. [Nemaha Co., Dec. 11, 1896] (Ka). Neosho Co.: Hummer s.n. [1898] (Ka). Osage Co.: E. G. Spalding 258 (Ka—92568). Osborne Co.: Neher 94 (Ka—79838). Ottawa Co.: A. S. Hitchcock s.n. [Ottawa Co., July 1895] (Ka). Pawnee Co.: A. S. Hitchcock s.n. [Pawnee Co., August 1895] (Ka). Pottawatomie Co.: G. Een s.n. [8.8.1950] (S); Imler s.n. [June 7, 1929] (Lw); Norton, Clothier, & Pond s.n. [July 1896] (Ka). Pratt Co.: A. S. Hitchcock s.n. [Pratt Co., Aug. 1896] (Ka). Rawlins Co.: L. B. Fry s.n. [Atwood, May 1891] (Ka). Reno Co.: A. S. Hitchcock s.n. [Turon, July 1892] (Ka). Republic Co.: D. K. Thomas s.n. [Scandia, 1890] (Ka). Rice Co.: A. S. Hitchcock s. n. [Rice Co., August 1895] (Ka). Riley Co.: F. C. Gates 12655 (Mi), 12748 (Ka—72836, Um—57); Imler s.n. [5/27/29] (Lw); Nason

s.n. [5-31-1899] (Ka); J. B. S. Norton 392 (Ka, N), s.n. [Manhattan, Aug. 1892] (Ka). Rooks Co.: E. Bartholomew s.n. [Rockport, June 25, 1889] (Ka); Mayhew 4 (Ky). Rush Co.: A. S. Hitchcock s.n. [Rush Co., August 1895] (Ka). Russell Co.: A. S. Hitchcock s.n. [Russell Co., July 1895] (Ka). Saline Co.: Eccles 10676 (Ll); Hancin 418 (Ka--76789); A. S. Hitchcock s.n. [Saline Co., June 1896] (Ka). Scott Co.: F. C. Gates 16688 (Ka--75859); A. S. Hitchcock s.n. [Scott Co., August 1895] (Ka). Sedgwick Co.: T. L. Andrews s.n. [Wichita] (Io--48485); Aquinas 122 (Ka--87579); A. S. Miller s.n. [Wichita, Mar. 1892] (Ka). Seward Co.: Kellerman s.n. [Arkalon, June 27, 1888] (Ka). Shawnee Co.: Norton & Clothier s.n. [July 4, 1895] (Ka). Sheridan Co.: A. S. Hitchcock s.n. [Sheridan Co., June 21, 1897] (Ka). Sherman Co.: A. S. Hitchcock s.n. [Goodland, June 26, 1892] (Ka). Smith Co.: Kellerman s.n. [Smith Centre, July 10, 1888] (Ka). Stafford Co.: H. T. Porter s.n. [Stafford Co., July 13, 1896] (Ka). Stanton Co.: A. S. Hitchcock s.n. [Stanton Co., August 1895] (Ka). Stevens Co.: G. B. Henry 103 (Vi); A. S. Hitchcock s.n. [Stevens Co., August 1895] (Ka). Sumner Co.: A. S. Hitchcock s.n. [Wellington, July 1892] (Ka). Thomas Co.: A. S. Hitchcock s.n. [Thomas Co., June 27, 1897] (Ka); W. C. Wallace 10 (Ky). Trego Co.: A. S. Hitchcock s.n. [Trego Co., July 1895] (Ka). Wabaunsee Co.: A. S. Hitchcock s.n. [Wabaunsee Co., Aug. 23, 1896] (Ka); Norton & Clothier s.n. [7-4-1895] (Ka). Wallace Co.: Demaree 29411 (Le); Sci. Exped. '85 s.n. [July 5, 1885] (Ka, Ka). Washington Co.: Imhoff 6 (Ka--93160). Wichita Co.: A. S. Hitchcock s.n. [Wichita Co., July 31, 1895] (Ka). Woodson Co.: G. M. Clark s.n. [Batesville, Aug. 20, 1894] (Ka); W. H. Horr s.n. [7/11/30] (Lw). Wyandotte Co.: K. K. Mackenzie s.n. [Argentine, May 4, 1895] (C), s.n. [Kansas City, Aug. 15, 1897] (Ka, We). MISSOURI: Adair Co.: C. S. Sheldon 1962 (N), 6512 (N). Atchison Co.: H. A. Gleason 9285 (N). Clay Co.: Broussard s.n. [VII.2.1947] (Je--5959); C. J. Elmore s.n. [Liberty, Aug. 17, 1923] (Je--3151); Gier 8077 (S, S), s.n. [VII-10-50] (Je--6780); K. K. Mackenzie 109 (S). Greene Co.: Blankinship s.n. [Springfield, 6-11-1887] (Ka). Jackson Co.: B. F. Bush 287 (C), 4010 (N), 12675c (Bt--15524); K. K. Mackenzie s.n. [May 16, 1896] (N); G. Smith s.n. [Kansas City, July 26, 1871] (Up--17093). Lincoln Co.: J. Davis s.n. [Whiteside, 1-6-15] (Vt). Marion Co.: J. Davis s.n. [29-7-12] (Au), s.n. [13-6-18] (Gg--31312). Mercer Co.: Palmer & Steyermark 41310 (N). Pike Co.: J. Davis 2414 (Du--87277). Platte Co.: Radloff s.n. [June 29, 1956] (Ur). Saint Louis Co.: Flatfelter s.n. [Near St. Louis, 7-16-92] (Mi); Letterman s.n. [Allenton, July 6, 1911] (Or--14361). Schuyler Co.: Palmer & Steyermark 41085 (N). Wayne Co.: E. J. Palmer 6106 (Po--217664). Saint Louis: Drummond s.n. [St. Louis] (Au--121810); Eggert s.n.

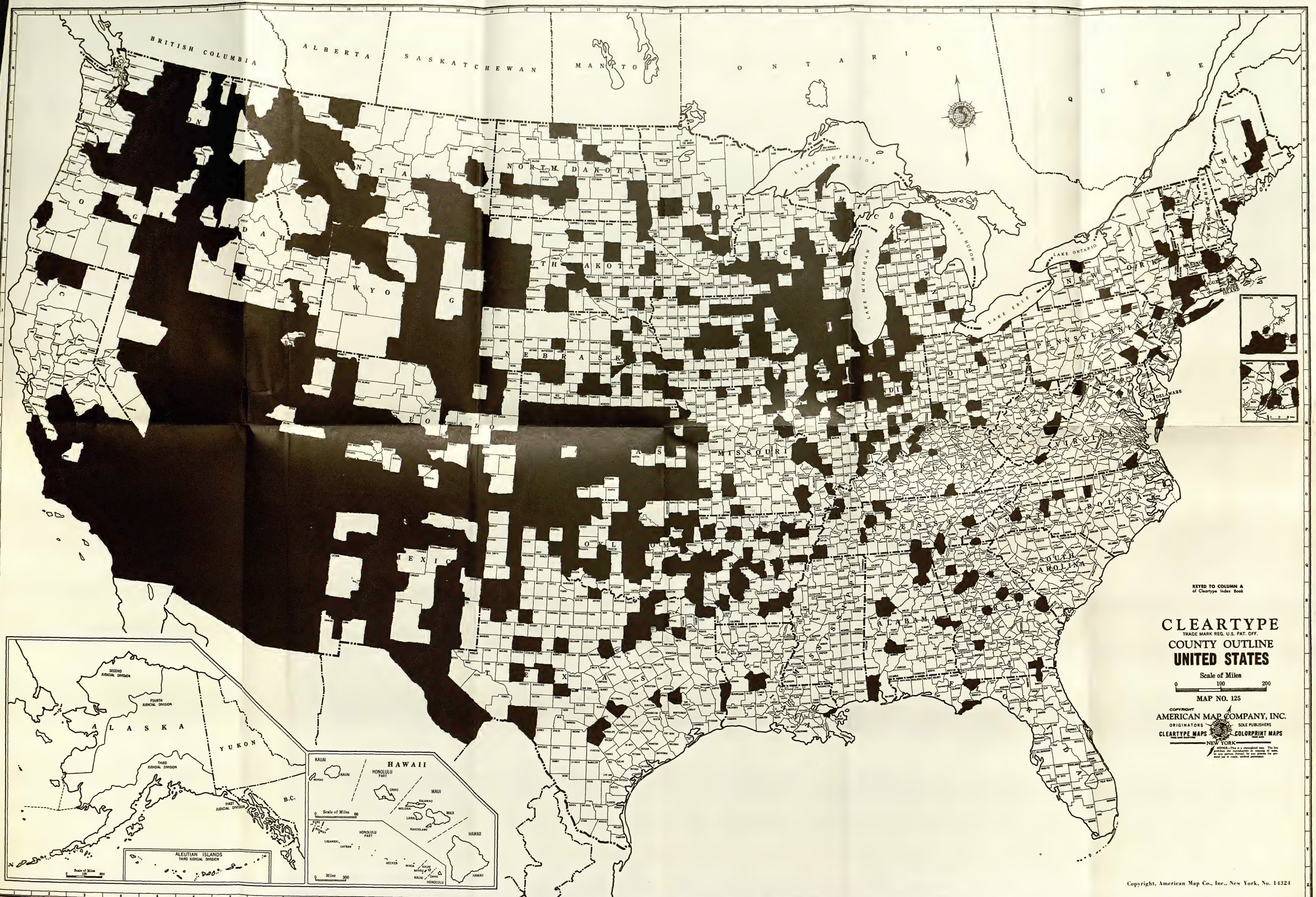
[Herb. Geete 5699] (Go); Engelmann 335 (Pr), s.n. [St. Louis, July 1848] (Au--121797); Letterman 78 (Po--267658); M. Martens s. n. (Br); Riehl 9 (Br, M). ARKANSAS: Bradley Co.: Demaree 25503 (Bm), 25505 (Sm). Clark Co.: Demaree 17826 (N). Conway Co.: Demaree 25085 (Bm). Craighead Co.: Demaree 7027 (N), 27044 (N, Ok, St). Desha Co.: Demaree 26522 (N). Drew Co.: Demaree 18053 (N), 24901 (Sm). Garland Co.: Demaree 20412 (N, Sm). Hot Spring Co.: Demaree 17958 (N, Pl--131512), 18469 (N), 19335 (N, Sm). Lawrence Co.: Demaree 30767 (N). Logan Co.: Mrs. H. S. Young s.n. [1925] (Cm). Newton Co.: D. M. Moore 32347 (Au). Prairie Co.: Demaree 37763 (Sm, Z). Pulaski Co.: Demaree 8623 (Du--234144, Gg--237851, N); Hasse s.n. [May 9, 1885] (N). Saint Francis Co.: Demaree 11415 (Bt--31371, V); S. McDaniel 1124 (N). Scott Co.: Demaree 18179 (N). Stone Co.: Demaree 42729 (Gg). Washington Co.: F. L. Harvey 62 (Cm, Cm, Mi, Ur), s.n. [Curtiss 1962] (I), s.n. [Fayetteville, May] (Ur). County undetermined: Welch 1108 [Mt. Magazine, Ozark Mts.] (Dp). LOUISIANA: Orleans Par.: Cocks s.n. [N. O., July 1901] (Tl). Rapides Par.: C. R. Ball 553 (N). MONTANA: Broadwater Co.: Hitchcock & Muhlick 11825 (N). Carter Co.: Lovisik 911 (Mn--35077), 1098 (Mn--35078). Cascade Co.: F. W. Anderson 102 (Ca--25140), 333 (Mn--11789), s.n. [Sand Coulee, Sept. 1888] (Mn--15380); V. L. Marsh 668 (Mn--26734). Custer Co.: Wahlgemt 417 (Mn--35076). Dawson Co.: L. H. Pammel s.n. [Glendive, Aug. 14, 1904] (Io--46429). Flathead Co.: Rogers & Rogers 1066 (Pl--127462). Gallatin Co.: J. W. Blankinship 410 (Me, Mn--6882, S, Vi), s.n. [Bozeman, July 22, 1898] (Mn--30578, N); Hitchcock & Muhlick 12478 (N); W. W. Jones s.n. [Bozeman, July 15, 1901] (Ca-164937). Jefferson Co.: H. R. Flint 20-31 (Mn--31847). Lake Co.: B. T. Butler 637 (N), 639 (N); M. E. Jones s.n. [Ravelli, July 14, 1909] (Po--74944). Lewis & Clark Co.: B. T. Butler 4110 (N); Cramer s.n. [Herb. U. S. Dept. Agr. 44046] (Mn--10164); J. T. Howell 7899 (Gg--241082); G. N. Jones 5351 (Ur); F. D. Kelsey s. n. [7/21/92] (Ob--50867). Liberty Co.: Rishoff 627 (Mn--26733). Missoula Co.: Bache 270 (Mn--27227); F. A. Barkley 1685 (Mn--28558); M. E. Jones s.n. [Fort Missoula, August 2, 1909] (Po--74943); Kirkwood 2095 (Ca--352334, Ca--882602, Mn--16133, N); V. L. Marsh 591 (Mn--33742); F. H. Rose 213 (Mn--35074), 533 (Mn--33088, Pl--98764); J. H. Sandberg s.n. [Missoula, Aug. 1892] (Ca--25139, Pl--45403). Park Co.: Hitchcock & Muhlick 13567 (N); C. W. Simpson 7a (Ca--882607, N); Suksdorf 917 (Pl--139839). Powder River Co.: F. H. Rose 335 (Mn--34292, Pl--98765). Powell Co.: Hitchcock & Muhlick 11520 (N). Rosebud Co.: J. W. Blankinship s.n. [Forsyth, June 29, 1898] (Se--43545), s.n. [Rosebud, June 29, 1898] (Se--43359); B. D. Lund 49310 (Mn--8987). Sanders

Co.: Sandberg, MacDougal, & Heller 972 (N, Po--84184). Silver Bow Co.: Babich 381 (Mn--26732). Stillwater Co.: E. W. Elliott 29 (Mn--35083, N); G. Peterson 1006 (Mn--35071). Sweetgrass Co.: Eggleston 7970 (N); Hitchcock & Muhlick 13305 (Ca--757473, Gg, N, S). Teton Co.: Senn, Franklin, & Gillett 5646 (Vi). Toole Co.: Rishoff 575 (Mn--26731). Wheatland Co.: C. L. Hitchcock 2335 (Mn-23760, Po--221514, Rs--14046), 2427 (Mn--23947, Po--222072, Rs--13978). County undetermined: Engelmann s.n. [July 1839] (Br); F. D. Kelsey s.n. [Montana] (Ob--50865); Lamson-Scribner 209 [Indian Creek] (Pa); Lejeune s.n. (Br); Severy 17 [Kootenai National Forest] (Mn--14309, Ob--50864); Wied-Neuwied s.n. [1833] (Br). IDAHO: Ada Co.: J. A. Clark 55 (Ba, Ca--450173, Du--24169, N, Po--63861, S), 279 (Ba, Ca--450172, Ca--882615, Du--24159, Fg--4311, N, N, Pl--44968, Po--63855, S); Mulford s.n. [Boise, July '92] (C). Adams Co.: J. H. Christ 12950 (N); R. J. Davis 2412 (Pl--109493). Bannock Co.: J. H. Christ 2321 (N), 9003 (N); Cronquist 213-36 (Ua--46497, Ua--46498); R. J. Davis 69-34 (N), 327-37 (Id); Intermountain Herb. 3730 (Ca--528594, Ua--11381). Benewah Co.: C. Epling s.n. [Santa, July 1929] (La). Boise Co.: R. J. Davis 162-37 (Id); Hitchcock & Muhlick 9960 (N, Pl--155093, Se--93284). Bonner Co.: J. H. Christ 11554 (N); C. Epling 10380 (La), s.n. [Granite Station, July 1929] (La); Pammel & Dudgeon s.n. [Sand Point, 8-4-05] (Io--93832). Canyon Co.: J. F. Macbride 200 (Cm, N, Pl--22565, Ur). Clark Co.: J. H. Christ 5807 (N); Cronquist 757-37 (Ua--30546, Ua--46499); H. J. Rust 457 (Gg--31305). Franklin Co.: C. B. Maguire 17171 (N, N, Pl--124747, Ua--47422). Fremont Co.: Cronquist 1473 (Ua--33710); Merrill & Wilcox 776 (N). Gem Co.: A. Beard 11862 (N). Gooding Co.: E. Knox s.n. [Gooding, June 2, 1931] (Sd--23977). Idaho Co.: J. H. Christ 12668 (N); Colson s.n. [Horseshoe Bend, May 17, 1946] (S); R. J. Davis 3207 (Pl--127067); Q. Jones 366 (N). Kootenai Co.: J. H. Christ 10256 (N), 12973 (N); H. J. Rust 457 (Gg--31301). Latah Co.: Aldrich 13677 (N); J. H. Christ 1646 (N); Stillinger 309 (Mn--35080); B. L. Turner 2279 (Tl). Lewis Co.: Hunter 102 (Pl--46881). Minidoka Co.: Christ & Christ 18535 (N). Nez Perce Co.: W. H. Baker 5895 (N), 5918 (N); J. H. Christ 2529 (N), 3955 (N), 9066 (N); Gail 13679 (N); Ownbey & Weber 2746a (Gg--381233, N), 2746b (Gg-381234); Sandberg s.n. [June 1892] (La), 264 (Gg--31309); Sandberg, MacDougal, & Heller 264 (Du--24160, Fc, Me, N, Po--84181). Payette Co.: J. H. Christ 8578 (N); R. A. Harper s.n. [Payette, Aug. 4, 1890] (S, Um--241, Um--247). County undetermined: L. F. Henderson 4070 [Link of Big Lost River] (Mi); Sandberg 972 (Gg--31308). WYOMING: Albany Co.: Benson 5059 (Po--267656); A. Nelson 1652 (Po--70646, Ur), 7671 (Cm, Io--22910, N, Po--63871); L. O.

Williams 1060 (Ca--882611, Gg--210261, Go, I, N, S, Ua--11380). Carbon Co.: Cantelow s.n. [Rawling to Laramie, July 15, 1942] (Gg--316096). Crook Co.: L. W. Carter s.n. [Devil's Tower, 8/14/1897] (N). Goshen Co.: Petrak 50081 (N), s.n. [4.VIII.1950] (S). Hot Springs Co.: O. Degener 1300 (N). Johnson Co.: Tweedy 3365 (N, Se--20576). Laramie Co.: R. J. Davis 319-W (Id); Fremont s.n. [Evening Camp from N. to South Fork, July 12] (C); F. W. Johnson 13 (N); Ownbey 294 (Pl--98767). Natrona Co.: Goodding 207 (Du--75655, N, Po--63896). Niobrara Co.: F. H. Knowlton 148 (N). Park Co.: Marston 359x (S). Platte Co.: C. L. Porter 3987 (Ca--714781, N, S). Sheridan Co.: Reppert, Paddock, & Ellis 83 (Io--111462); Tweedy 2663 (N). Yellowstone National Park: Bright s.n. [7-30-19] (Cm); Mearns 3432 (Du--24163), 5009 (N). County undetermined: Black 36-5182 [Sherman Pass] (Be--45869); Hayden Survey s.n. [Aug. 1 - Sept. 13, 1870] (N); A. Nelson 320 [Blue Grass Hills] (C, Cm, Ur); B. Taylor 26 [Cherokee, Park Colorado] (Ok). UTAH: Beaver Co.: Parker, McClintock, & Robbins 6347 (Ca--736876, N). Box Elder Co.: Brendel s.n. [Brigham City] (Ur); B. Maguire 228 (Ua--11372). Cache Co.: A. D. Smith s.n. [August 3, 1938] (Ua--47458). Emery Co.: Clover & Jotter 1934 (Mi); M. E. Jones 5478 (Ca--159677, N, Po--70155). Garfield Co.: F. A. Barkley 4414 (Mn--35070). Grand Co.: Rydberg & Garrett 8365 (N). Juab Co.: Becraft & Starr 391 (Ua--11378); Cutler 2432 (Ca--882609, Gg--271241); Maguire & Becraft 2786 (Ua--11379). Kane Co.: B. Maguire 18937 (Ua--47421); F. M. Stone 316 (N); Tidestrom 2390 (Mi). Millard Co.: D. D. Keck 632 (Ca--423603, Du--199162, Po--194725); Maguire & Becraft 2785a (Ua--11371). Morgan Co.: Pammel & Blackwood 3960 (Io--32026). Piute Co.: Rydberg & Carlton 7043 (N). Rich Co.: M. E. Jones 1488 (Ua--11373), s.n. [Alta Wahsatch Mts., Aug. 2, 1879] (Br, Go, N). Salt Lake Co.: M. S. Baker 4835a (Ro), 4835b (Ca--421125); M. K. Clemens s.n. [July 10, 1908] (Du--24162); A. O. Garrett 1726 (N), 8620 (Ca--882604); Jepson 21228 (Ca); M. E. Jones s.n. [City Creek Canon, Sept. 1, 1900] (Po--70649), s.n. [City Creek Canon, Sept. 4, 1905] (Gg--153863); F. E. Leonard 85/83 (Po--214222), s.n. [July 11, 1885] (Ob--50868); Pammel & Blackwood 3529 (Io--83752), 3589 (Io--28506, Io--70428); Rydberg & Carlton 6894 (N); S. Watson 823 (C). San Juan Co.: Rydberg & Garrett 9200 (N). Sanpete Co.: Olsen s.n. [July 12, 1934] (N, Ua-47420). Summit Co.: A. O. Garrett 6454 (Dp). Uintah Co.: E. H. Graham 6078 (Cm, N), 7341 (Cm, Gg--236313). Utah Co.: H. Ream 9298 (Ca--882605). Wasatch Co.: Harrison & Larsen 7754 (Ua--35864); Waterfall 15097 (St). Washington Co.: S. B. Benson 32 (Ca--526426); Degener & Peiler 16476 (N); Gierisch 569 (N, Ua--47419); F. W. Gould 2027 (Ca--882592, N); Edw. Palmer 401 (C, N, Pa), s.n. [St. George, 1875] (Bc). County undetermined: Capt.

Figure 5. Distribution of Verbena bracteata in the United States

Mapping by counties done by Andrew R. Moldenke



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COUNTY OUTLINE
UNITED STATES
Scale of Miles
0 100 200

MAP NO. 125

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Bishop s.n. [1872] (Ka); G. A. Black 36-7647 (N); E. W. Davis s. n. [Cove Fort, 11 July 1927] (Um--249); Elrod s.n. [Utah, '86] (Mn--6881); Tidestrom 11183 [Preuss Lake near Clay's Ranch] (I); Ward 30012 (Ur). NEVADA: Churchill Co.: R. A. Allen 272 (N), 375 (Ca--882588, Du--286896); B. A. B. Ross 67 (Ca); Tidestrom 10773 (La). Clark Co.: A. M. Alexander 661 (Ca--625572); Alexander & Kellogg 1739 (Ca--541322); Clokey 5571 (Ba, Bl--42293, Ca--900542, Ca--900939, Du--269964, N, Se--47256, Ua--31277), 8096 [Herb. Forestry Serv. 91934] (Ak--15513, Al, Au, Au, Ba, Bt--58933, Ca--900541, Cm, Dp--4676, Du--283209, En, Fc, Ge, Gg--310861, Gu--19775, H--71857, I, Io--155041, It, Ka--94615, Ky, Mh, Mn--35081, Ms, N, N, Ob--201144, Ok, Or--41063, Pl--95255, Po--258168, Rs--23943, S, Se--20425, Se--54785, St, St--19052, Ua--39356, Up, Ur, We), 8097 (Ca--900546, N), 8473 (Ca--900545, Dp--14043, Gg--310860, N, Pl--110326, S, Se--84785, Ua--43899), 8473a (Ca--900543); T. Craig 1468 (Po--184576); Goodding 2312 (Ca--146624, Cm, N); Louise Kellogg 1739 (Se--62361); LaRivers & Hancock 574 (Ca--882589, Ca--900550); S. B. Parish 10288 (Ca--183650, Du--91086); Tidestrom 9582 (S); Train 1913 (Ca--900548, Tu--35538), 1984 (Ca--900540, Du--286897, N, N). Elko Co.: A. H. Holmgren 1459 (Ca--676171, N); P. B. Kennedy 3069 (Du--16340). Eureka Co.: M. E. Jones s.n. [Palisade, June 14, 1882] (Po--70652). Humboldt Co.: Archer 196 (Mi); Hillman s.n. [Sept. 1, 1897] (Po--70561). Lander Co.: Goodner & Henning 1097 (H--69222). Lincoln Co.: G. W. Gullion 582 (Ca--52111); M. E. Jones s.n. [Panaca, Sept. 6, 1912] (Po--69911); Minthorn 253 (Ca--450174). Lyon Co.: R. A. Allen 259 (Ca--882590). Nye Co.: Bentley s.n. [Currant, June 1916] (Du--140008, N, Po--129057, Po--267642); Goodner & Henning 1329 (Ca--900547, Fs); LaRivers & Hancock 716 (Ca--900549). Storey Co.: C. A. Purpus 5946 (Ca--104813). White Pine Co.: M. A. King s.n. [Warm Springs, Oct. 1917] (Gg--31310). COLORADO: Adams Co.: Demaree 29526 (Le, Sm, Sm). Arapahoe Co.: Garfield Univ. Sci. Exped. 332 (Ur). Archuleta Co.: C. F. Baker 564 (B, Ca--104860, N, Po--64520, S); F. S. Earle 25 (N); Schmoll 1074 (Bl--42302). Boulder Co.: R. E. Buchanan s.n. [Ward, 8/10/1901] (Io--107610); H. W. Campbell 552 (Bl--42264); A. T. Evans 189 (Bl--42266), 239 (Bl--42268), 273 (Bl--42267); Ewan 11418 (Gg--345033), Pl. Exsicc. Gray. 1090 (Al, Au, Ba, Ca--717704, Dp--22366, Du--277515, En, Gg-284501, H--67363, I, Mi, Ms, Ms, N, Ok, Pl--108606, Po--257693, S, Sm, Um--250, Up, Ur, We); Hynes s.n. [Boulder, Aug.-Sept. 1924] (Au); S. L. James 103 (Bl--42363); McFarlane s.n. [1881] (Bl--42255); K. E. Phelps s.n. [Bloomfield, June 1915] (Gg--31315); Ramaley 1108 (Bl--42262), 9568 (Bl--42265), 9720 (Bl--42249), A.120 (Bl--42258); W. W. Robbins 4173 (Bl--42360), 4405 (Bl--42250), 4470 (Bl--42257); Skinkle 150 (We); Tweedy 5126 (N); M.

S. Young s.n. [Boulder, Sept. 1913] (Au). Chaffee Co.: Waterfall 10906 (St). Cheyenne Co.: Cory s.n. [9-3-1940] (N). Conejos Co.: Ramaley 12984 (Bl--42286), 14147 (Bl--42288). Crowley Co.: M. T. Jones s.n. [May 28, 1932] (Bl--42361). Delta Co.: Burritt 97 (Bl-42252). Denver Co.: Babcock s.n. [Cory 27781] (N); Bethel s.n. [Denver, June 1893] (Fc), s.n. [1910] (Gg--31302); Demaree 15271 (N); Eastwood 25 (Bl--42260, Ca--148189, Gg--31317, Ok), s.n. [Denver, July 1886] (Bl--42256); Ferril s.n. [July 29, 1901] (Bl-42253); Heustis s.n. [Platte near Riverside, June 26, 1916] (Bl--42261), s.n. [Riverside, 6-26-16] (Bl--42251); T. Holm 61 (I), s. n. [6/8/1896] (S), s.n. [11/8/1896] (I); Redfield 521 (Pr); Schmoll 735 (Bl--42254); H. G. Smith s.n. [Denver, Aug. 17, 1888] (Ga, Pl--22622). El Paso Co.: Atkinson s.n. [July 15, 1895] (Pl--86890); Bacigalupi 919 (Du--195802, Po--172348); Biltmore Herb. 1082c (S); S. L. Clarke s.n. [September 19-21, 1895] (C, C); Clements & Clements 9 (Du--24158, Io--23730, N, Ob--86567); J. H. Ehlers 7630 (Mi), 7677 (Mi, Mi), 7761 (Mh, Mi); Harper & Harper s.n. [Manitou, July 12, 1900] (Io--133189); M. E. Jones 143 (Br, Go, N, Po--183131, Ua--11377); Loftfield 119 (Bl--42285); Rusk s. n. [C. C. campus, 7/10/1942] (Je); A. H. Smith s.n. [Manitou Springs, August 1878] (Up--17094); M. S. Young s.n. [Green Mountain Falls, 9/25/17] (Au). Fremont Co.: T. S. Brandegee s.n. [Canon City, 1877] (Ca--169222); Waterfall 10877 (St). Gunnison Co.: C. F. Baker 920 (N, Po--63872); H. N. Wheeler 626 (Bl--42263). Huerfano Co.: McAllister s.n. [Cuchara Camps, 8-16-23) (Au); Rydberg & Vreeland 5675 (N); Stigall s.n. [6/16/34] (Bl--42269). Jefferson Co.: L. S. Ehlers 218 (Mi); L. H. Pammel s.n. [Golden, Aug. 1919] (Io--100972); Ramaley 9906 (Bl--42273), 9913 (Bl--42272); W. W. Robbins 5780 (Bl--42271); Zobel s.n. [Deer Creek Canyon, May 25, 1934] (Bt--24675, Gg--220519). La Plata Co.: Moinat 22 (S); Way s.n. [Oxford, 1916] (Bl--42359). Larimer Co.: C. F. Baker s.n. [Fort Collins, 6-18-93] (Po--65183), s.n. [Fort Collins, 7-21-93] (Po--63894); M. S. Baker 4763b (Ca--421120, Ro); Collector undesignated s.n. [Ft. Collins, July 1926] (Nj); J. H. Cowen 2018 (Fc), 2019 (Fc, Mn--6883, Pl--22568), s.n. [Fort Collins, June 12, 1895] (N), s.n. [Fort C., July 29, 1896] (Io--22909, N); Crandall 172 [Halsted's Am. Weeds 172] (Ah, C, Fc, Io--15344, Mi, Ua--11375, Ua--27139, Ur, Vt, We), 311 (Fc); Kelso s.n. [Estes Park, July 1926] (Bt--18922); Lappin 185 (Ok), 186 (Au, Ok); W. F. Marshall 2017 (Fc); Pammel & Johnson 1749 (Io--24474); Preston s.n. [8-1-1921] (Fc); Ramaley 2758 (Bl--42259); C. S. Sheldon 38 (Al), s.n. [12 July 1884] (Ob-50866); G. F. Weber s.n. [Estes Park, 8/26/39] (Fl--21091). Las Animas Co.: Beckwith 161 (Gg--31307), 163 (Ca--216754). Logan Co.: E. J. Kraus s.n. [Sterling, June 19, 1926] (H--107720, Um--245).

Mesa Co.: S. G. Stokes s.n. [June 15, 1900] (Du--24174, N). Montezuma Co.: Bader s.n. (Bl--42274). Montrose Co.: C. F. Baker 288 (Ca--350142, Ca--104885, Du--143862, N, Pl--22567, Po--63873, Vt); Payson 934 (S); W. Stewart s.n. [Ute Pass, July 4, 1937] (La); E. P. Walker 402 (Ba, Pl--71400). Otero Co.: Rose & Fitch 17503 (N). Rio Grande Co.: Ramaley & Johnson 14568 (Bl--42289). Saguache Co.: Waterfall 12174 (Au--121809, Ok, St). Washington Co.: Ramaley 12462 (Bl--42287). Weld Co.: Ewan 12129 (En, Pl--122568); Osterhout s.n. [New Windsor, June 17, 1901] (Io--20753, Po--63899), s.n. [June 18, 1905] (Du--91087). County undetermined: J. E. Chase s.n. [Mammoth, 1904] (Ms); J. M. Coulter s.n. [Platte River, June 26, 1873] (N); Degener & Degener 27042 (N); McCosh & Greene s.n. [July-Aug. 1877] (Ml, Pr, Va); L. H. Pammel s.n. [Lookout Mt., Sept. 25, 1927] (Io--103087); Scovell s.n. [Colorado] (Mi); Vasey 527 (Ms). NEBRASKA: Adams Co.: R. de Lima 150 (I), 233 (I), 424 (N). Antelope Co.: Wernecke 82 (Gu--E.7745). Buffalo Co.: E. R. Holmes s.n. [Kearney, Aug. 1889] (Fc--2506); Pammel & Brownlie s.n. [Kearney, 6-27-99] (Io--15343). Cass Co.: M. E. Day s.n. [June 28, 1916] (Ob--99770). Dodge Co.: Engberg s.n. [Fremont, 1894] (Je). Douglas Co.: Eastman s.n. [Omaha, June 26, 1915] (Ur); Kleeberger s.n. [Omaha] (Gg--31299). Fillmore Co.: Muenscher & Muenscher 11607 (Ca--727596). Kearney Co.: C. Hapeman s.n. [Minden, May 31, '91] (Hp); H. Hapeman 8451 (H--5459), s.n. [Minden, Sept. 4, 1924] (Bt--45069, Up), s.n. [Minden, July 10, 1930] (En, Pl--61802, St--9230), s.n. [June 27, 1931] (Au), s.n. [Minden, June 15, 1933] (Ms, N); Herb. Univ. Nebr. 258 (Au, Au). Keith Co.: C. O. Erlanson 2253 (Ob--50776), 2255 (Mi). Kimball Co.: A. A. Heller 14303 (Au, Du--156892, Se--88034). Lancaster Co.: E. Armstrong s.n. [June 26, 1923] (Go); Herb. Okla. Coll. Women 312 (Ok); J. L. Sheldon s.n. [Lincoln, September 1897] (We), s.n. [Lincoln, 7.10.98] (We). Lincoln Co.: Plank s.n. [July 1896] (N). Madison Co.: F. J. Hermann 4504 (Mi). Merrick Co.: Mrs. E. J. Hill s.n. [E. J. Hill 208.1902] (Ur). Nemaha Co.: C. J. Elmore s.n. [Johnson, Oct. 1, 1890] (Je--3153); J. L. Sheldon s.n. [Peru, June 16, 1900] (We); Shubert s.n. [July 10, 1933] (Ob--50777). Otoe Co.: A. E. Allen s.n. [Talmage, June 18, 1891] (Je--3150); E. H. Jones 8 (Se--56453). Phelps Co.: McMillan s.n. [Holdrege] (Io--53119). Platte Co.: Clevenger s.n. [Columbus, June 10, 1904] (La). Thomas Co.: Krautter s.n. [Halsey, June 12, 1904] (Up--17132), s.n. [Halsey, July 26, 1907] (Up--46608); H. J. Webber s.n. [Aug. 7, 1889] (C). Washington Co.: Lallman s.n. [June 15, 1936] (Bt--45451). York Co.: M. K. Clemens s.n. [York, June 14, 1909] (Io--104447). Platte Islands [Buffalo Co.]: E. R. Holmes s.n. [Kearney, June 23, 1887] (Ca--216740). OKLAHOMA: Beaver Co.: Hindman 202 (St); Penfound P.387 (Ok). Beckham Co.: P. Hart 37

(Bt--48615); F. W. Pennell 10557 (N). Bryan Co.: W. S. Blain s.n. [Durant, July 6, 1935] (Bt--29682). Caddo Co.: Demaree 12533 (N, Ok); Edw. Palmer 246a (N); Van Vleet 32 (Ok--20480). Cherokee Co.: C. S. Wallis 646 (St). Cimarron Co.: Demaree 13290 (Ok, Ok), 13307 (N, Ok, Ok, Po--251719); F. C. Gates 20968 (Ka--92216); C. M. Rogers 4668 (Ok); Smith & Rinehart 82, in part (Ok); Stratton 5197 (Ml, N, St--26156); Waterfall 3139 (Ok, St), 3147 (Ok, St), 10756 (St). Cleveland Co.: Bamford s.n. [April 30, 1911] (Ok--20481); F. A. Barkley s.n. [5/19/28] (Ok--10289); Bayliff s.n. [July 4] (Ok--10294); Bruner s.n. [Norman, 8/2/24] (Io--117044, Ok--10287, Or--18975); Demaree 12471 (Ok--22198); C. T. Eskew 1938 (Ok), 2016 (Ok); Harness s.n. [May 5, 1911] (Ok--20482); Hopkins & Van Valkenburgh 5526 (Ok); Keesecker & Osborne 56 (Ok--20412); Louise Martin 19 (Ok--14226); I. J. Myers 64 (Ok--10297); Osborne & Keesecker 56 (St--12769); Perkinson 207 (Ok--20507), s. n. [6/28/19] (Ok--10296); Pusonet 90 (Ok--10293); Stemen 251 (Ok); C. Whaley 42 (Ok--10291). Comanche Co.: M. K. Clemens 11750a (Ba, Gg--37141); W. S. Myers 314 (Ok); D. Robertson 75 (Ok). Creek Co.: A. J. Sampson 73 (Or--40069). Delaware Co.: C. S. Wallis 2381 (St). Ellis Co.: Bruner s.n. [8/2/24] (Du--172645). Garfield Co.: Gephardt 379 (Ok). Garvin Co.: R. W. Pohl 5203 (Sm). Greer Co.: Bull 284 (Ok--10286). Harmon Co.: G. W. Stevens 1051 (Ok, St--9225). Harper Co.: McMurry 1180 (Ok). Kay Co.: Byler 277 (St); M. G. Wolfe s.n. [Sept. 15, 1931] (Ok--10273). Kingfisher Co.: Grace s.n. [June 20, 1935] (Ok--19055). Kiowa Co.: G. W. Stevens 1192 (Ok). Latimer Co.: Hopkins, Nelson, & Nelson 517 (Ok). Le-flore Co.: Blakley 1462 (Du--66336), s.n. [G. W. Stevens 1462] (St--9223, Ur). Lincoln Co.: O. M. Clark 2223 (B); Payton 85 (St--9224). Logan Co.: E. Beck 47 (We);Keyser s.n. [G. W. Stevens 6044] (N, Ok). Mayes Co.: C. S. Wallis 3439 (St). McClain Co.: M. Hopkins 12 (Ba, Ok, Ok, St--12975), 13 (Mn--33215, Ok, Ok, St--12974), 13360 (Ok--20510, Ok). McCurtain Co.: H. W. Houghton s.n. [G. W. Stevens 3726] (N). Murray Co.: Broadbent 83 (Ok); M. Hop-kins 6108 (Ca--882596, Ok, St--21418, We); Hopkins & Cross 6451 (N, Ok); Stratton 4732 (St--26141, St--26142). Muskogee Co.: E. L. Little 224 (Ok--10285), 1585 (Ok--10290). Noble Co.: Harding 92 (St--17568). Oklahoma Co.: W. S. Myers 90 [10-27-24] (Ok), s. n. [2-22-25] (Ok); F. W. Pennell 10579 (N); Waterfall 4442 (N, Ok, Si). Payne Co.: Ambrose 18 (Ob--84690); C. O. Chambers s.n. [Summer, 1919] (St--9231); Davy 102 (Au); Fry 110 (Au), s.n. [9-20-35] (Au); Gardenhire 77 (Ok); Graumann 39 (St--17553); Harding 257 (Ca--882606); Mader 22 (Ok); D. McLean 15 (Um--248); Powers 31 (N); L. E. Rose s.n. [August 2, 1939] (Bl--42296); Waterfall 113 (St). Pittsburg Co.: B. P. Keesecker 39 (Ok); E. Rogers s.n.

[June 12, 1957] (St). Pontotoc Co.: D. McCoy 722 (St), 1703 (St). Pottawatomie Co.: E. D. Barkley 296 (Ok--14474); F. A. Barkley 1452 (Mn--28598). Roger Mills Co.: J. Engelman 404 (Ok). Rogers Co.: Buffington 99 (Ok). Swanson Co.: G. W. Stevens 1192 (N, St--9229). Texas Co.: G. W. Stevens 391 (Du--65310, Ok, Ok, St--9240, St--9241); Q. Williams 36 (Tr--19291). Tulsa Co.: M. B. Clark 363 (St). Woods Co.: G. W. Stevens 680 1/2 (Ok), 2889 (Ok). Woodward Co.: P. J. White s.n. [July 9, 1900] (Dm). County undetermined: Gowan 26 (Ok--10292); "R. E. J." s.n. [7/1/19] (Ok--10295); Jeffs s.n. [Winding Stair Mtns., July 1, 1919] (Mn--25705); B. A. Keesecker s.n. [June 11, 1936] (Ok--20601); G. W. Stevens A.1462 (Ok), A.1564 (Ok). TEXAS: Bailey Co.: Harns 82 (Um--243). Bexar Co.: J. B. Davy 11 (Ca--25138). Bowie Co.: Correll & Correll 12398 (Ca--907252, Sm). Brazos Co.: Reeves 192 (N). Brewster Co.: Collector undesignated L.20-459 (Sr); Cory 9147 (Fs); Parks & Cory 9147 (Tr). Cochran Co.: B. B. Harris 526 (Nt). Collin Co.: Timmons 743 (Au). Comal Co.: Depprich 7767 (Sm). Culberson Co.: Tharp 43253 (Au, N). Dallas Co.: F. C. Gates 20972 (Ka--92225); C. L. Lundell 14015 (Sm); J. Reverchon 420 (Pa); Shinners 26626 (Go). Denton Co.: B. B. Harris s.n. [7-20-27] (Nt). El Paso Co.: B. Barlow s.n. [7 July 1911] (Ca--882613, La); M. K. Clemens s.n. [El Paso, June 7, 1917] (Po--175086); Lee, Berkman, & Tharp 46199 (Au, N); Pringle s.n. [El Paso, 11 June 1885] (Vt); Shinners 8941 (Sm); Thurber 90 (T); Vasey s.n. [El Paso, May 1881] (S), s.n. [El Paso, 1881] (Fl--21089); B. H. Warnock 4000/5818 (Au--122572); Waterfall 6622 (N); C. Wright 454 (Ca--215384). Erath Co.: Hoisington 83 (Au, Au, Ca--733348, Ok). Garza Co.: Tharp s.n. [7/9/41] (Au, N). Grayson Co.: Anderson & Hood 313 (Ok); R. Bebb 1412 (Ok). Hale Co.: J. F. Brenckle 48080 (Gg--381243, N); Waterfall 3703 (St); Whitehouse 9926 (N). Hansford Co.: Cutter 33, in part (Ok); G. J. Goodman 5289 (Ok). Hockley Co.: B. B. Harris s.n. [10-10-27] (Nt). Huspeth Co.: K. B. Reed s.n. [Grayson, Nov. 3] (Au); Tharp 46152 (Au, N). Hunt Co.: Legget s.n. [Loneoak, 7/15/1927] (Au); Tharp 2929 (Au, Au). Jeff Davis Co.: T. Head 10 (St). Johnson Co.: Whitehouse s.n. [Cleburne, 6-15-1930] (Au, Ca--882603, Mi, N). Lamb Co.: Demaree 40876 (Gg); Tharp 6274 (Au). Lipscomb Co.: C. S. Wallis 7118 (St). Lubbock Co.: Demaree 7562 (Au, Du--205782, H--52537), 7704 (Du--205758); F. W. Gould 7122 (Au--123217, Ca--38005); E. J. Palmer 12496a (Au--121765, Ca--425608); E. L. Reed 3940 (Bl--42292); Tharp 6284 (Au). Menard Co.: Cory 29734 (N); Parks & Cory 9765 (Tr). Mitchell Co.: R. W. Pohl 4998 (Sm). Moore Co.: Jespersen & Jespersen 2708 (Ca--774452, N). Newton Co.: Tharp s.n. [7-23-39] (Au). Ochiltree Co.: C. S. Wallis

4755 (St), 4762 (Au—123217, St). Potter Co.: York & Rogers 41 (Au—123198). Presidio Co.: Hinckley 694 (N, N, Sm), s.n. [Marfa, July 1936] (Au, Au, Fc); Steiger 1308 (N). Randall Co.: Cory 13530 (Md); E. J. Palmer 13861 (B); Parks & Cory 13529 (Tr). Reagan Co.: Parks & Cory 18940 (Tr). Roberts Co.: C. S. Wallis 4944-1, in part (St). Sherman Co.: Weaver 17793 (Tr—16182). Swisher Co.: Whitehouse 9961 (N). Tarrant Co.: Ruth 109 (Cm, Io—113679, Ka—67108, N, N, Nt, Ob—50779, Up, Ur); Whitehouse 16263 (N). Taylor Co.: S. M. Tracy 8001 (Au, Cm, Es, N, Vt). Terry Co.: E. L. Reed 3774 (Au); Tharp 4506 (Au, Um—246). Tom Green Co.: Cory "CI" (Po—19226). Travis Co.: Herb. Univ. Texas s.n. [Lake Austin, 5/10/33] (Au), s.n. [5/10/33] (Au). Walker Co.: Warner s. n. [Huntsville, May 20th] (Hu). Wheeler Co.: Parks & Cory 16145 (Tr), 16146 (Tr). Wichita Co.: Mahler 1258 (St). Wood Co.: C. L. Lundell 12081 (N). County undetermined: Thurber 607 [Valley of the Rio Grande] (N); Warner s.n. (Hu). NEW MEXICO: Baca Co.: Hershey 2352 (Sm). Bernalillo Co.: C. C. Ellis 221 (N); M. E. Jones s.n. [Albuquerque, 9-4-1884] (Po—246766); Koelz s.n. [Sandia Mts., June 28, 1926] (Mi), s.n. [Albuquerque, September 8, 1926] (Mi). Carson Co.: Hitchcock, Rethke, & Raadshooven 4180 (Ca—603818, Du—257367, Gg—267612, Pl—89844, Se—45728). Chaves Co.: Earle & Earle 351 (N, Po—63868); N. A. Palmer 60, in part (S). Colfax Co.: C. F. Baker s.n. [Cimarron, Jul. '01] (B); Lucas 164 (Au); P. C. Standley 14249 (Du—122874). Curry Co.: Whitehouse 8738 (Au). Dona Ana Co.: Archer 335 (Mi); Campbell & Keller 735 (Ca—882608); Wooton 409 (Ca—104811, Du—75589, Ka, N, Po—243563), s.n. [Mesilla Valley, May 17, 1893] (Ur), s.n. [Organ Mts., Aug. 28, 1897] (Po—70878, Tu—98879), s.n. [June 7, 1904] (N); Wooton & Standley 3330 (Au, Du—24177, Fs, Hp, Mn—6889, Or-8857, Pl—22571, S). Eddy Co.: Grassl 32 (Mi). Grant Co.: Maguire, Richards, & Moeller 11963 (N, N, Ua—47418); O. B. Metcalfe 137 (Ca—130178, Ca—138819, Ca—882810, Dm, Du—91158, N, Po—70887, Tu); W. S. Stewart s.n. [Pinos Altos, June 26, '36] (Bl—42297, En, La, La, Mi). Quay Co.: G. L. Fisher s.n. [Nara Visa, July 8, 1911] (Ew). Rio Arriba Co.: Waterfall 11114 (St); C. B. Wolf 2925 (Ba, Du—191126, Gg—174046, Rs—9995). Sandoval Co.: Koelz s.n. [James Springs, July 4, 1926] (Mi); Rousseau 35089 (Vi). San Juan Co.: Wooton 2831 (Ob—50876). San Miguel Co.: Arsène 1894 (B), 18343 (Gg—187237), 18543 (Po—148758), 18593 (Po—148392), 18634 (N, Po—148686), 18885, in part (Po—148523), 18961 (Po—148657), 18964 (N, Po—148643), s.n. [Las Vegas] (N); P. C. Standley 5136 (N); Whitehouse 8739 (Au). Santa Fe Co.: Arsène 15734 (Du—243429), 15840 (N), s.n. [vicinity of Santa Fe] (B); Clear s.n. [July 6, 1947] (Gg); Marcelline 1819 (Mi); Renner 294 [Herb. Forest Serv.

43460] (Ca--137930); P. C. Standley 4458 (N), 4549 (N). Sierra Co.: Beals s.n. [Lake Valley, August 1904] (Mi); Cutler 2057 (Ca-882610); O. B. Metcalfe 897 (Gg--282672, Io--141748), 1008 (Gg--31303, N, Po--63858, Po--84185, Vi). Socorro Co.: Eggleston 20225 (W--152413); H. H. Rusby 81 (St--24045), 336 (C, Mi, Ob--50869, Pr, Se--14960), s.n. [Ft. Craig, Aug. 1888] (Dt). Taos Co.: Whitehouse 8740 (Au). Union Co.: Demaree 12278 (N, Ok), 13278 (Ok, Pl--84105, Sd--24049). Valencia Co.: O. Degener 4873 (Ms); Wooton s.n. [Aug. 1, 1892] (C). County undetermined: Engleman s.n. [Therma, August 17, 1934] (Ok--18362); Fendler 585 (Pr), 587 (Ca--711045); C. Wright 1499 (T). ARIZONA: Apache Co.: Collector undesignated s.n. [Navaho Reservation, July 1918] (Ca--202336); Cutler, Goodman, & Payson 2951 (Du--272803); Deaver 3902 (Fg--5966), 4101 (B, Fg--5967); Goodman & Hitchcock 1317 (Bt--12931, Ca--426360, Du--191999, Gg--183907, Mi, Mi, N); Herb. Univ. Arizona s.n. [Navaho Reservation, July 1916] (Fs, N); Peebles & Smith 13568 (N, To); L. C. Whitehead s.n. [Navajo Reservation, June-Sept. 1916] (Ca--882612). Cochise Co.: Darrow, Phillips, Gould, & Pultz 1486 (Ca--777821, Tu--10880). Coconino Co.: Aubineau 5 (Fg--8037); R. S. Beal s.n. [Flagstaff, 30 June 1947] (Ca--942564); Benson 9618 (Po--267641), 9649 (Po--267655); Clover 5070 (Mi, Tu--18627); Clute 93 (N, Ur); Collom s.n. [Grand Canyon Village, Sept. 1, 1943] (Fg--9145); Deaver 2509 (Fg--3096), 3784 (Fg--5253), 4364 (Fg--8038); Demaree 42782 (Gg); Ellison 1107 (La); Fulton 6288 (To), 9654 (Ca--540265); Goodding 45-48 (Gg--415499), 163-49 (S), 1492 (Fg--8035), 1595 (Fg--8036); H. C. Hanson A.147 (Au, Bl--42294, Or--20489, Ur); A. A. Heller 15783 (Ca--726124, N, Se--87491); Herb. Univ. Ariz. s.n. [Flagstaff, June-July 1915] (Tu); J. T. Howell 24405 (Gg--342814), 24600 (Gg--342813); H. E. Lee s.n. [Flagstaff, 9-23-36] (Tu); MacDougal 286 (Ca--187471, Dp, Io--38749, N); Peebles 14346 (To); H. H. Rusby s.n. [Oak Creek, May 30, 1883] (C, Mi); P. O. Schallert s.n. [5/30/43] (N, Ur), s.n. [west of Winslow, 5/15/43] (N), s.n. [6/16/43] (Pl--133007, Ur), s.n. [9/1/43] (Au, Ok); J. J. Thornber s.n. [Flagstaff, August 5, 1907] (N, Tu--35537). Gila Co.: F. W. Gould 3918 (Ca--737174, N); Parker, McClintock, & Robbins 6111 (Ca--736880). Graham Co.: Bohrer 393 (Gg--377372); J. J. Thornber 5554 (Ok), 5674 (Tu). Mohave Co.: Ahles 9223 (Ur, We), 9408 (Ur). Navajo Co.: Eastwood & Howell 6572 (Dp--4677, Gg--261698); L. Hamilton s.n. [K. F. Parker 8338] (S); G. J. Harrison 5494 (To); Herb. Univ. Ariz. s.n. [Navaho Indian Reserv., July 1916] (Tu); Mrs. R. W. Hoyt s.n. [Ft. Apache, 1893] (C); Klinger s.n. [Newcomb's, June 24, 1934] (Tu); Peebles & Fulton 9636 (To); Pultz 1714 (Tu--16148); Whitehead s.n. [Navajo Indian Reserv., June-Sept. 1916] (Tu);

Whiting 854/2798 (To). Pima Co.: Darrow & Haskell 2072 (N), 2172 (Ca--705224, Tu--16143). Pinal Co.: Peebles & Harrison 1754 (To), 2061 (Io--128475). Yavapai Co.: W. W. Jones s.n. [Verde Valley, July 25, 1920] (Ca--407936), s.n. [Camp Verde, July 7, 1922] (Ca-407935, Ca--407937); E. B. Kurtz s.n. [July 18, 1937] (Up); Loomis 3133 (To); Peebles, Harrison, & Kearney 2692 (To), 4243 (La); H. H. Rusby 336 (Pa), 780 1/2 (Mi), s.n. [June, 1883] (C, Pr), s.n. [1883] (Up--17091). Yuma Co.: S. B. Parish 8490 (Tu--98876). WASHINGTON: Adams Co.: Jeffrey s.n. [June 22, 1946] (Ca--755256); St. John, Beedon, Davison, Ransom, & Ridout 7163 (Ca--613657). Asotin Co.: Hitchcock & Muhlick 8341 (Ca--968444, N, Pl--155092, Se--93285). Benton Co.: Cotton 621 (Pl--22585); Goff 136 (Ca--882601, Ro); L. F. Henderson s.n. [Prosser, May 26, '92] (Pl--22621); G. N. Jones 387 (Pl--41136); C. S. Parker 653 (Pl--47538); L. S. Rose 48153 (Go, N, S, S); R. Sprague s.n. [Aug. 16, 1938] (Or--37663). Chelan Co.: Muenscher & Muenscher 11215 (N); Purer 7792 (Du--268787, N, Sd--24252); Raven 10112 (Gg--409688); J. W. Thompson 6901 (Du--208092, Or--28268, Se--21478), 6930 (Se--21477), 10808 (St--15931); Whited 1373 (Pl--22581), s.n. [June 21, 1904] (Or--12376). Clark Co.: Suksdorf s.n. [Vancouver, Aug. 16, 1894] (Pl--138591). Douglas Co.: Sandberg & Leiberg 340 (Br, Ca--170667, Gg--31316, N, Pl--22616, S). Franklin Co.: Dana 694 (Pl--100118); Jennings & Jennings 8888 (Cm), 8911 (Cm); Raven 10363 (Gg--408548). Grant Co.: H. W. Smith 1178 (Pl--84538); J. W. Thompson 6732 (Se--21479). King Co.: Otis 803 (Gg--31313, Pl--128712). Kittitas Co.: Cotton 1363 (Pl--22584); Otis 2030 (Pl--93351); H. W. Smith 1410 (Se--38581), 1776 (Pl--84537); J. W. Thompson 9067 (Ca--518319, Du--224006, N, Po--204259, Se--21480). Klickitat Co.: F. E. Lloyd s.n. [Dalles, July 1894] (N), s.n. [23 Aug. 1894] (N); Suksdorf 207 (Pl--138428), 5102 (N, Pl--138363), s.n. [July 22, 1881] (Ca--192061, Cm, Mi, Pl--72005); J. W. Thompson 11109 (Se--15933). Okanogan Co.: Batie s.n. [Twisp, April 24, 1922] (Bt--35894); Dillon 832 (Ca--739565, Pl--151101); Fiker 14 (Pl--76371); R. A. Harper s.n. [Aug. 9, 1890] (S); M. E. Jones s.n. [Oroville, June 26, 1911] (Po--69916). Spokane Co.: Milburge 1420 (Se--10847), s.n. [May 1930] (Du--209473, Se--21476), s.n. [June 1931] (Se--21922); Suksdorf 1976 (N, Pl--138403). Stevens Co.: Kreager 474 (Ca--882614, N, Pl--22580, Se--68369, Um--242), 874 (Pl--22576), s.n. [Mission, Aug. 22, 1902] (Pl--22575). Wallawalla Co.: Wilkes Expl. Exped. s.n. [Wallawalla & Kooskookoo] (T). Whitman Co.: Eastwood & Howell 3074 (Gg--235441); Elmer 324 (N), s.n. [Wawawai, June 1896] (Po--63895), s.n. [Wawawai, June 1898] (Vt); Lake & Hull 606 (Pl--22618); Otis 1937 (N, Pl--93537, Se--16141, Se--26170), 1967 (Pl--92337); C. V. Piper 1542 (Pl--22619, Se--14950); St. John & Warren 3395 (Ca--613582, N, Pl).

Yakima Co.: L. F. Henderson s.n. [June 12, '92] (Se--14949); Suksdorf s.n. [June 7, 1884] (Pl--138430); Vasey 468 (N, Pl--22579); Watt s.n. [Aug. 1895] (Pl--22617). County undetermined: T. S. Brandegee 1032 (Ca--190923); J. H. Howell s.n. [Lower Cascades, June 1886] (Pa); Jennings & Jennings s.n. (Cm). OREGON: Baker Co.: W. A. Weber 3148 (N). Clackamas Co.: E. P. Sheldon 8856 (N). Deschutes Co.: J. F. Brenckle 51440 (Le). Gilliam Co.: Applegate 6519 (Du--239351); C. D. Mell s.n. [Arlington, Aug. 26, 1903] (N). Hood River Co.: Gorman s.n. [Lower Cascades, July '90] (Se--14940); L. F. Henderson 797 (Or--8853); J. T. Howell s.n. [Cascades, June 1886] (Se--21476); Lyman s.n. [Cascade Locks, 7-30-95] (Dt); E. P. Sheldon 12179 (Du--92289). Malheur Co.: Ferris & Lorraine 12993 (Du--378824); Fleischman s.n. [Ontario, 5-20-30] (Or--35766); R. A. Pendleton s.n. [September 22, 1954] (N). Morrow Co.: Hills 6 (Or--25509), 14 (Or--25512), 26 (Or--25510); L. S. Rose 41413 (Al, Ca--882599, Gg--310865); J. W. Thompson 4880 (Du--179362, Po--215928). Multnomah Co.: Suksdorf 3014 (Pl--138413), s.n. [Aug. 15, 1894] (Pl--138427). Sherman Co.: W. E. Lawrence 413 (Du--100815). Umatilla Co.: H. E. Brown 58 (Dm, N); Dana s.n. [Hermiston, Oct. 4, 1937] (Or--34436); Evinger s.n. [Pendleton, 9/3/27] (Or--31167); Gorman s.n. [near Weston, June 1, '05] (Mn--16973); Griffiths & Hunter 18 (N); W. E. Lawrence 806 (Du--104714); Leiberg 912 (N); W. A. Weber 3106 (Ca--754994, N); Zivney 5 (Or--38566). Wallowa Co.: E. P. Sheldon 8202 (N). Wasco Co.: Abrams 9487 (Du--133965, Po--127890); T. S. Brandegee s.n. [The Dalles, 1882] (Ca--169223); Gilkey s.n. [The Dalles, June 120, 1924] (Or--18252, Or--45975); M. E. Jones s.n. [The Dalles, June 27, 1897] (Po--70654); Lyman s.n. [The Dalles, 7-30-95] (Dt); E. P. Sheldon 12179 (Du--75590); Suksdorf s.n. [June 8, 1897] (Pl--138426); J. W. Thompson 2821 (Du--171167, Se--21474). Washington Co.: Solbrig 2909 (Ca--177947). Wheeler Co.: Ebert s.n. [July 20, 1944] (Or--48935). Hayden Island [Coos Co.]: J. W. Thompson 3789 (Du--171163, Se--21473), 3909 (Du--171801). Sauvin's Island [Multnomah Co.]: J. T. Howell s.n. [June 1886] (Or--8852). County undetermined: W. C. Cusick 1967 [Eastern Oregon] (Ca--25134, Pl--22623); E. Hall 393 (N, Pa). CALIFORNIA: Kern Co.: T. S. Brandegee s.n. [Cameron Lake, March 28, 1901] (Ca--104817); Hoover 2667 (Ca--596163, Ca--766870, N); L. R. Short 295 [U. S. Forest Serv. 21066] (Ca--661057); Twisselmann 1264 (Gg--391012). Los Angeles Co.: Abrams 343 (Du--143860), 1741 (Du--143861, Po--4005), 2574 (Du--24164, N, Po--156282), s.n. [Inglewood, June] (Ca--205361); M. K. Brandegee s.n. [Bixby, August 1, 1910] (Ca--185367); Braunton s.n. [May 10, 1902] (Du--9559), s.n. [5/15/1902] (Du--75592); L. T. Chamberlain s.n. (N);

Fosberg S.4105 (N, S, Up); Condit s.n. [Gardena, July 27, 1908] (Ca--456150); H. M. Hall 6724 (Ca--127514); I. M. Johnston s.n. [Nigger Slough, s. Calif., April 11, 1917] (Du--108994, Po--4006); McClatchie s.n. [Long Beach, 8/3/1896] (N, N); Parish & Parish 1596 (Br, Du--91089). Madera Co.: H. Barnes s.n. [Madera, Sept. 25, 1930] (Ca--420788). Merced Co.: Eastwood 17956 (Gg--176070); Jepson 17484 (Ca); Mason & Smith 8252 (Ca--192059); Nobs & Smith 165 (Ca--192060, Gg--417903). Modoc Co.: Woods & Tidestrom 2779 (I). Orange Co.: D. L. Crawford s.n. [Laguna Canyon, 7/26/16] (Ca--205360, Po--4004); Fosberg S.1020 (Up); E. R. Johnson 11285 (Rs--30445); Munz 2207 (Po--4014), 6349 (Po--12443), 6598 (Po--17441); E. L. Paddock 12733 (N); Peirson 4651 (Du--139670, En). Riverside Co.: Ewan 5220 (Ca--472156, Du--212741, En, Gg--194565, Po--182470). San Bernardino Co.: S. B. Parish 8490 (Du--91088), s.n. [3 June 1891] (Ca); Parish & Parish 2171 (Ca--25135, Du--90891, N, Or--8854, Pl--22620, S, Ua--11376, Ur--17458). San Diego Co.: Abrams 3198 (Du--24166, N); Cleveland 353 (Sd--6788); Fenoge 1235 (Po--148016); Orcutt s.n. [San Diego, 7-8-1884] (Cm), s.n. [S. D., 9-8-1884] (Mi), s.n. [San Diego, Sept. 1884] (Pa). San Joaquin Co.: M. K. Brandegee s.n. [Lathrop, Sept. 1907] (Ca--139765); Jepson 10285 (Ca); Suksdorf 7a (Pl--138408), 7b (Pl--138407). San Luis Obispo Co.: C. Dudley s.n. [Atascadero Lake, July 4, 1936] (Gg--235651); R. J. Ferris 9770 (Ca--652680, Du--269818, Gg--310871, Mi, Se--52775); Jepson 15888 (Ca); Edw. Palmer 342 (Pa). Santa Barbara Co.: J. L. Fox s.n. [Santa Barbara] (I); H. M. Pollard s.n. [Aug. 6, 1952] (Gg--385809). Siskiyou Co.: W. B. Cooke 15356 (Ca--45319, Du--277307, N, Or--42075). Stanislaus Co.: Hoover 94 (Ca, Ca--767060, N). Tulare Co.: Congdon s.n. [Oct. 1881] (Du--24165). Ventura Co.: Fendge 1838 (Po--145297); H. M. Pollard s.n. [Mirror Lake, May 3, 1946] (Gg--333017). County undetermined: M. K. Brandegee s.n. [Bissell Station, Mojave Desert, July 16, 1912] (Ca--185368); Edw. Palmer s.n. [1876] (Du--200649); Vasey s.n. (Bl--42291). CHANNEL ISLANDS: Santa Catalina: Fosberg S.5403 (N). MEXICO: Baja California: Mearns & Schoenfeld 2925 (Du--9556); C. R. Orcutt 1228 (Io), 1549 (Dt, Ur), s.n. [Tijuana, 4-7-1885] (Ca--24136), s.n. [Aug. 31, 1889] (Mi). Coahuila: E. G. Marsh 1214 (St); Edw. Palmer 1048 (Io, Pa, Vt). Federal District: Rutten & Rutten-Pekelharing 378 (Ut). San Luis Potosí: Parry & Palmer 715 (Pa). Sonora: Gregg s.n. [near St. Lorenzo, June 2, 1819] (T); P. B. Kennedy 7032 (Ca--373595). SWEDEN: Ander s.n. [VIII.1923] (Ew, Go, S); C. Sandberg s.n. [6/9/1913] (S). GERMANY: Kausch s.n. [Aug. 1915] (La). CULTIVATED: Belgium: Lejeune s.n. (Br); P. Martens s.n. [h.b.L.] (Br). Denmark: Herb. Schumacher s.n. (Cp). France: W. H. Harvey

s.n. [Julio 1818] (Du—166495). Germany: Herb. Molliano 528 (Br); Herb. Mus. Bot. Stockholm s.n. [h. Berol.] (S). Locality undesignated: Herb. W. H. Harvey s.n. (Du—166494). LOCALITY OF COLLECTION UNDETERMINED: Burke 1827 [Rocky Mountains near California] (Ut—97722); Collector undesignated s.n. (Je); Cranwill s.n. [July 23, 1917] (Ur); F. V. Hayden s.n. [Sargent's Bluff on banks of Missouri, July 1856] (Dt); Herb. Coll. Pharmacy s.n. (Pa); Herb. Decaisne s.n. (Br); Herb. Martius s.n. (Br, Br); Herb. Molliano 288 (Br), s.n. (Br); Herb. Mus. Bot. Stockholm 2109 (S), s.n. (S, S); Herb. Parry s.n. (Io); Herb. Torrey s.n. [Rocky Mountains] (T), s.n. [N. W. Coast] (T); M. Martens s.n. (Br); C. R. Orcutt s.n. (Ca—104882, Ca—104883); Edw. Palmer 341 [California, Arizona, etc.] (C); Prier s.n. [Tablequah] (St—9227); Schleuse 35007 (Au); Show s.n. [Kansas & Nebraska boundary] (C); Wallberg s.n. [1808] (Lu); A. Wood s.n. (Pa).

VERBENA BRACTEATA f. ALBIFLORA (Cockerell) Moldenke, Phytologia 2: 146. 1946.

Synonymy: Verbena bracteosa albiflora Cockerell in Daniels, Fl. Boulder Colo. 204. 1911. Verbena bracteosa var. albiflora Cockerell ex Moldenke, Prelim. Alph. List Invalid Names 45, in syn. 1940. Verbena bracteosa f. albiflora Cockerell ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947.

Literature: Cockerell in Daniels, Fl. Boulder Colo. 204. 1911; Perry, Ann. Mo. Bot. Gard. 20: 304. 1933; Moldenke, Prelim. Alph. List Invalid Names 45. 1940; Moldenke, Alph. List Invalid Names 45. 1942; Moldenke, Phytologia 2: 146. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 22. 1947; Moldenke, Alph. List Cit. 2: 494 & 495 (1948) and 4: 981. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 26 & 197. 1949; Moldenke, Résumé 32, 360, & 471. 1959; Moldenke, Résumé Suppl. 2: 3 (1960) and 3: 36. 1962.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Theodore Dru Alison Cockerell on the campus of the University of Colorado at Boulder, Boulder County, Colorado, on July 15, 1908. It is said to inhabit bottomlands, and has been collected in anthesis in July and August. Even though Cockerell published the original name for this taxon as a trinomial, in the manner of zoologic subspecies, he followed it with the expression "n. var.", indicating that a varietal status was intended. The only recorded common name is "white-flowered large-bracted vervain". Three herbarium specimens have been examined.

Citations: WASHINGTON: Klickitat Co.: Suksdorf s.n. [Bingen, Aug. 11, 1895] (N, Pl—138404), s.n. [Aug. 24, 1898] (Pl—138356).

VERBENA BRASILIENSIS Vell., Fl. Flum. 17 (1825), Icon. 1: pl. 40.

1827.

Synonymy: Verbena littoralis α pycnostachya Schau. in A. DC., Prodr. 11: 542. 1847. Verbena littoralis f. angustifolia Chod., Bull. Herb. Boiss., sér. 2, 2: 818, hyponym. 1902. Verbena approximata Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 292--293. 1904. Verbena litoralis var. pycnostachya Schau. ex Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 292, in syn. 1904. Verbena litoralis var. brasiliensis (Vell.) Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 292. 1904. Verbena cordobensis Briq., Ann. Conserv. & Jard. Bot. Genèv. 10: 100--102. 1907. Verbena boliviana Briq. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena brasiliensis Mart. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena braziliensis Vell. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena litoralis f. pycnostachya Schau. ex Moldenke, Alph. List Invalid Names Suppl. 1: 25, in syn. 1947. Verbena littoralis f. pycnostachya Osten ex Moldenke, Alph. List Invalid Names Suppl. 1: 25, in syn. 1947. Verbena hasta L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 24, in syn. 1947. Verbena litoralis f. angustifolia Chod. ex Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94 & 198. 1949. Verbena littoralis var. pycnostachya Schau. ex Moldenke in Humbert, Fl. Madag. 174: 9, in syn. 1956. Verbena bonariensis var. veris Hassler ex Moldenke, Résumé 359, in syn. 1959. Verbena officinalis var. gracibras Lehm. ex Moldenke, Résumé 371, in syn. 1959. Verbena littoralis var. pycnostachya DC. ex Moldenke, Résume Suppl. 3: 40, in syn. 1962.

Literature: Vell., Fl. Flum. 17 (1825), Icon. 1: pl. 40. 1827; Schau. in A. DC., Prodr. 11: 542. 1847; Schau. in Mart., Fl. Bras. 9: 189. 1851; Jacks., Ind. Kew. 2: 1178. 1895; Chod., Bull. Herb. Boiss., sér. 2, 2: 818. 1902; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 292--293. 1904; Briq., Arkiv Bot. Stockh. 2 (10): 11. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 480--481. 1904; Briq., Ann. Conserv. & Jard. Bot. Genèv. 10: 100--102. 1907; Prain, Ind. Kew. Suppl. 3: 187. 1908; Hicken, Chloris Plat. Argent. 197. 1910; Glaz., Mém. Soc. Bot. France 1: 544. 1911; Prain, Ind. Kew. Suppl. 4: 245. 1913; Sanzin, Anal. Soc. Cient. Argent. Buenos Aires 88: 114. 1919; Moldenke, List Spec. Mold. Southeast. Set 10. 1930; Stapf, Ind. Lond. 6: 429. 1931; Perry, Ann. Mo. Bot. Gard. 20: 252, 255--256, & 355. 1933; Fern., Rhodora 40: 371 & 455. 1938; Moldenke, Annot. & Classif. List 108. 1939; Moldenke, Prelim. Alph. List Invalid Names 44, 47, & 56. 1940; Moldenke, Suppl. List Invalid Names 8. 1941; Moldenke, Lilloa 6: 324--325 (1941) and 8: 428. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 3, 5, 6, 9, 10, 15, 31, 35, 39--42, 44, 74, 80, & 101. 1942; Moldenke, Alph. List Invalid Names 45, 46, & 48. 1942; Jepson, Fl. Calif. 3 (2): 380. 1943; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Sampaio & Peckolt, Arquiv. Mus. Nac. Rio Jan. 37: 392. 1943;

Moldenke, Lilloa 10: 345 & 382. 1944; Cabrera & Dawson, Rev. Mus. La Plata, ser. 2, Bot., 5: 357 & 381. 1944; Moldenke, Castanea 10: 37, 39, & 42. 1945; Moldenke, Alph. List Cit. 1: 16, 17, 21, 22, 25, 28, 41, 42, 45, 56, 76, 82, 83, 90, 93, 94, 97, 121, 127, 139, 147, 158, 171, 172, 177, 192, 196, 204, 212, 219, 221, 222, 245, 263, 282--284, 288, 289, 291, 296, & 298. 1946; Kuhlmann & Kuhn, Flor. Dist. Ibiti 117. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 22, 24, & 25. 1947; Moldenke, Phytologia 2: 327--329 & 332. 1947; Moldenke, Wrightia 1: 222. 1948; Moldenke, Castanea 13: 112, 115, 116, 118, & 121. 1948; Moldenke, Alph. List Cit. 2: 363, 364, 366, 367, 369, 374, 393, 407, 444--446, 448, 456--458, 478, 479, 489, 495, 497, 506, 517, 520, 523, 526, 527, 530, 533, 534, 551, 554, 559, 575, 584, 585, 599, 601, 602, 610, 611, 626, 628, & 632 (1948), 3: 668, 672, 679, 685, 691, 693, 705, 710, 717, 730, 738, 742, 749, 751, 755, 767, 779, 781, 782, 807, 809, 815, 837, 841, 846--848, 852, 857, 861, 863, 869, 871, 874, 875, 885, 893, 894, 899, 913, 935, 949, 955, & 966 (1949), and 4: 980, 985, 1003, 1004, 1010, 1074, 1075, 1077, 1081, 1087, 1099, 1100, 1106, 1108, 1116, 1123, 1132, 1138, 1140, 1142, 1147, 1155, 1164, 1166, 1167, 1177, 1183, 1191, 1204, 1213, 1222, 1224, 1229, 1231, 1239, 1241, 1248, 1288, 1292, 1293, 1299, 1300, & 1302. 1949; Moldenke, Am. Wild Fls. 293 & 450. 1949; A. L. & H. N. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 6--8, 10, 11, 18, 19, 23, 26, 27, 47, 61, 73, 94, 97, 99--101, 105, 122, 163, 197, & 198. 1949; Moldenke, Phytologia 3: 135 (1949) and 3: 288, 290, 294, & 305. 1950; Moldenke, Revist. Sudam. Bot. 8: 165. 1950; Fern. in A. Gray, Man. Bot., ed. 8, 1209--1210 & 1612. 1950; Moldenke, Phytologia 3: 449, 450, & 467. 1951; Stellfeld, Trib. Farmac. [Vellozoa] 19 (10): 166. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209 & 2210. 1951; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 126--128. 1952; Moldenke, Phytologia 4: 266 (1953) and 5: 26. 1954; Thorne, Am. Midl. Nat. 52: 313. 1954; Moldenke, Inform. Mold. Set 48 Spec. [4] (1954), 49 Spec. 3 (1954), and 51 Spec. 4. 1956; Moldenke in Humbert, Fl. Madag. 174: 5, 7, & 9--10, fig. I, 3 & 4. 1956; Ahles, Bell, & Radford, Rhodora 60: 22. 1958; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 2, 3: 126--128. 1958; Moldenke, Am. Midl. Nat. 59: 334 & 346. 1958; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 9--11, 13--15, 22, 23, 28, 32, 33, 55, 69, 84, 109, 115, 118, 119, 121, 126, 154, 156, 223, 357--360, 362, 365, 368, 369, 471, & 472. 1959; Moldenke, Résumé Suppl. 1: 2, 3, & 7 (1959) and 2: 3 & 12. 1960; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Lewis & Oliver, Am. Journ. Bot. 48: 639--641. 1961; Moldenke, Résumé Suppl. 3: 3--5, 7, 8, 10, 14, 25, 39, & 40. 1962; J. A. Clark, Card Ind. issue 24. n.d.

Illustrations: Vell., Fl. Flum. Icon. 1: pl. 40. 1827; Moldenke in Gleason, New Britton & Br. Illustr.Fl., pr. 1, 3: 128. 1952; Moldenke in Humbert, Fl. Madag. 174: fig. I, 3 & 4. 1956; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 2, 3: 128. 1958; Lewis & Oliver, Am. Journ. Bot. 48: 640. 1961.

Erect, robust or coarse, perennial herb, to 3.1 m. tall, often suffrutescent or woody at the base, erect; stems rigid, wiry, stout, erect, often numerous, several from the base, very acutely tetragonal, often much branched, eventually constricted or slightly subarticulate at the nodes, green, smooth, glabrous throughout or practically glabrous below and somewhat scabrous-pubescent above, the upper parts often naked, the angles sometimes prominent and white; rhizome creeping; middle stem internodes 5--20 cm. long; branches ascending or divergent-ascending, their upper parts naked; leaves varying from sessile or subsessile to short-petiolate, the petiole (if regarded as such) 0.3--1 cm. long and broadly winged; lower and middle leaf-blades oblong or elliptic to oblong-lanceolate or lanceolate, 3--19 cm. long, 1--2.3 cm. wide, shortly acute at the apex, somewhat convex along the margins, shortly and cuneately attenuate at the base and prolonged into the petiole, rather rigid, green on both surfaces, scabridous or strigillose and somewhat pustulate above with impressed venation, sparsely pubescent beneath, penninerved, more or less crenate-dentate along the margins to sharply serrate or incised, at least above the middle, the teeth 0.5--1 mm. long and 1--2 mm. apart or the uppermost 1--2 mm. long and 3--6 mm. apart; upper leaf-blades greatly narrowed, lanceolate to linear-elliptic or linear, to 1.5 cm. long and 3--5 mm. wide, entire or subentire, more or less subrevolute along the margins; secondaries 4 or 5 per side, more or less prominulous beneath, eventually impressed above, subparallel on the upper leaves; spikes cylindric and compact during anthesis, mostly short and strict, slender, 1--8 cm. long (rarely to 14 cm. long), densely congested and densely flowered toward the apex, not uniformly loose, 4--5 mm. wide, sometimes with the lower flowers more loosely scattered, ternately pedunculate, fastigiately paniculate toward the apex of the branches, usually sessile in open cymes, not crowded, eventually elongating; bractlets ovate-lanceolate or lanceolate to lanceolate-setaceous, about 3 mm. long, scarcely as long as or longer than the calyx or subequaling the flowers, subulate at the apex, ciliate, appressed-puberulent on the back or strigose-pubescent especially along the margins; flower-buds purplish-brown; flowers small; calyx ovate-campanulate, 2.5--3.5 (or more) mm. long, its tube 2--2.5 mm. long, somewhat shortly appressed- or strigose-pubescent on the outside (especially on the ribs), the teeth 5, short, lanceolate, usually about 0.5 mm. long, acute, the short subulate tips connivent after anthesis; corolla small or minute, varying from blue, deep-blue, dark-blue, clear-blue, blue-violet, or blue-lilac to purplish-blue, lavender-blue, lavender, purplish, pale-lilac, lilac, pale-purple, or purple, sometimes violet, pale-violet, white-violet, pinkish, pink, or red, occasionally lavender with a pale center, slightly surpassing the calyx, its tube darker, finally exserted 0.5--0.8 mm. from the calyx, short-puberulent or pubescent outside, the limb inconspicuous, about 2.5 mm. wide, the lobes 5, small, subequal, emarginate, barbulate-pubescent at the throat; pistil and the 5 stamens scarcely or not at all surpassing the corolla-

mouth, usually included; cocci oblong or oblong-linear, yellowish-brown or brown, 1.5--2 mm. long, shorter than the calyx, the dorsal surface strongly striate with 5 longitudinal ribs, raised-reticulate at the apex, the entire inner face minutely papillate, with the commissural surface plane and minutely scaberulous; chromosome number: n = 14, 2n = 28.

The type of this species was collected by José Mariano da Conceicao Velloso at or near Rio de Janeiro, Brazil, and is no longer available for examination, and this fact has contributed to the considerable confusion regarding the true identity of the species. Briquet proposed several species to take care of what appear to be forms of one and the same taxon, although more study is needed here to dispel all doubts. The type of his V. approximata was collected by Benedict Balansa (no. 1027c) at Assomption, Paraguay, on January 5, 1875; the type of his V. cordobensis was collected by Paul Günther Lorentz (no. 131) at Estancia Germania, Córdoba, Argentina, between June and December, 1874; and the type of V. boliviana was gathered by Gilbert Mandon (no. 524) in Bolivia. The type of V. littoralis f. angustifolia was collected by Emil Hassler (no. 3853) in a swamp near Tucangua, Paraguay, in February, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, as are also the types of the other names referred to above. V. bonariensis var. veris is based on Teodoro Rojas 1045 from near San Bernardino, Paraguay, collected in February, 1915, and deposited in the herbarium of the Museo de Historia Natural at Montevideo.

The V. cordobensis form of the species is characterized by greatly elongate spikes, and is well represented by Morong 128 from Paraguay and by Ruiz Leal 8398 from Argentina. The short-spiked more typical form of the species is well represented by Barros Valenzuela 8045 from Chile and by a whole series of Argentinian specimens, including Cuezzo 1290 and 2210, Luna Risso 935, and Villafañe 794, 917, and 970. The type of V. officinalis var. gracibras Lehm. is Jörgensen 3767 from Paraguay, deposited in the Dudley Herbarium at Stanford University.

Verbena brasiliensis, as interpreted by me, is a widespread species, native from Colombia and Brazil south through Peru, Bolivia, Paraguay, and Uruguay to Chile and Argentina, but widely introduced and naturalized in the United States from Virginia to Florida and along the Gulf coast to Texas, as well as in Oregon and California, Jamaica, South Africa, and Madagascar. It is cultivated in Brazil, Uruguay, Belgium, and Maryland, having been introduced into cultivation in 1904. It may be distinguished from V. bonariensis by its leaves being cuneate-attenuate to the sessile or subpetiolar base, not cordate nor amplexicaul as in V. bonariensis. Cabrera & Dawson (1944) call it a hemicryptophyte frequent in wet soil in Bolivia, Paraguay, Uruguay, and northern Argentina. Kuhlmann & Kühn (1947) refer to it as a nomophyte.

Schauer (1851) divides his V. litoralis H.B.K. into two varieties [he calls them "forma"]. The first of these, α pycnostachya, he characterizes as "spicis virgineis densioribus subcylindricis" and to it he brings the V. litoralis H.B.K., V. brasiliensis Vell., V. bonariensis β litoralis Hook., and V. glabrata H.B.K. as synonyms. His second variety, β leptostachya, he characterizes as "spicis jam virgineis magis filiformibus, dein saepius valde elongatis et relaxatis" and to it he brings V. caracasana H.B.K. and V. lanceolata Willd. as synonyms. He notes "Forma umbrosa, plerumque magis glabrata, spicis pube appressa subcanescentibus. Varietates ceryis limitibus haud circumscribendae crebis modificationibus intermediis invincem transeuntes." He says also "Utraque forma vulgaris in campis Brasiliae meridionalis, e. gr. in prov. Sebastianopolitana circa urbem; Harrison, Gardner, Lhotsky, Sellow, Ackermann, Mart. (Herb. Fl. Bras. n. 1033), Guillemin, Vauthier (n. 192), Lund; in prov. Minarum: Riedel, Raben, Regnell (n. 326). Forma α etiam provenit in Bonaria, Chile, Peruvia, Colombia, Venezuela: — forma β in Mexico, Venezuela, Guiana." I regard V. litoralis, V. brasiliensis, and V. glabrata, as well as V. bonariensis, as separate species, albeit often with what appear to be intermediate forms (which may represent natural hybrids).

Concerning his V. approximata Briquet says: "Cette espèce est très voisine du V. litoralis et n'est pas facile a en distinguer quand les feuilles inférieures manquent. Le V. litoralis possède des feuilles inférieures moins oblongues, grossièrement et irrégulièrement incisées-dentées, tandis qu'elles son régulièrement et finement crénelées-dentées dans le V. approximata. En outre, ce dernier a des tiges à angles plus aigus, presque subailés grâce au sillonnement des faces, et des feuilles inférieures plus allongées étroitement linéaires, plus raides. L'inflorescence et las caractères floraux sont tout à fair ceux du V. litoralis var. brasiliensis." Concerning his V. cordobensis he says: "Cette espèce est rapportee par Grisebach dans l'exsiccata cite au V. ephedroides Cham. Mais ce dernier type, special au Brésil méridional et a l'Uruguay, en differe abondamment par ses feuilles toutes réduites a de petits phyllomes linéaires très courts ou a des écailles, ses tiges bien moins robustes, a angles moins tranchants et moins saillants, a rameaux fastigies, ramasses, ses epis très courts densiflores, ses calices oblongs depassant sensiblement les bractees. Le V. cordobensis est plus voisin des V. littoralis et V. Isabellei pas l'ensemble de son organisation; c'est cependant, dans ce dernier groupe, l'espèce qui se rapproche le plus des Junciformes."

Collectors state that V. brasiliensis is found along ditches, roadsides, and waysides, railroad tracks and low pastures, disturbed soil, between sugarcane fields, in and near cultivated ground, in wet uncultivated ground and fields, marshy and swampy

places, on ballast dumps and ballast ground, riverbanks, levees, and open rocky hillsides, in moist spots along watercourses and irrigation ditches, the edges of fields, in shallow pools on prairies, in shady places, pinelands, flax fields, roadside swales, marshes, fields, swampy meadows, irrigated fields, swampy lowlands, dry sandy or waste ground, swamps, rocky fields, and coastal prairies, in open woods or open places in woods, campos, batture, vacant lots and waste places in general, moist valley land and coastal areas, the sandy clay of road embankments, limestone soil at the edge of montes, black soil, open hillsides, and even subparamos. It is perhaps most characteristic of wet places. In Brazil it has been collected from sea-level to 900 m. altitude, in Arkansas at 300 feet, in California from 80 to 700 feet, in South Africa from 4200 to 5500 feet, in Bolivia from 6500 to 12,000 feet, in Chile from 200 to 1200 meters, in Argentina from 460 to 1620 meters, in Mexico from 1000 to 2000 meters, in Peru from 1000 to 3700 meters, and in Colombia from 1700 to 3250 meters. It has been collected in anthesis during every month of the year, and in fruit from April to December and in February. In the United States it blooms throughout the year, but mostly from April to September.

In Louisiana Ewan describes it as "common in grassy places" and "a tall rank weed along battures", while Ashbey says it is "frequent in cane fields" and "frequent in drainage ditches" and that it occurs mixed with Ambrina ambrosioides in sugarcane fields and along ditch banks. Demaree avers that it is "very common all along the coast in Mississippi. In Texas it was found by Gould in partial shade along roads through pine forests, while in California it is common in large clumbs along roadsides in Yuba County according to Raven, is locally common in low ground in Butte County according to Howell, is found on ditch banks in irrigated pasture areas in San Joaquin County according to Crampton and occurs in light-colored clay-like soil on roadcut slopes in Eldorado County according to the same collector, who also refers to it as a "weed in vacant lots" in Sacramento County. Howell reports it as a "roadside weed" in Stanislaus County. This collector's no. 30055, by the way, is said to be from the type region of V. hansenii Greene. Feddema says that the species is common in wet meadows in loam soil exposed to the sun in Nayarit and in grasslands with occasional shrubs on moist clay loam in open sun in Michoacán.

In the Transvaal it occurs in mountainous areas with many springs and streams, some wooded and some grassy areas, on basically dolomites and limestone covered with deep humus in many places, according to Rodin.

Collectors in South Carolina report it there from waste ground, roadsides, railroad yards and rights-of-way, warehouse areas, creek bottom woods, fields, swamp forests and forest margins, and in sandy marl along waterways. In Alabama it has been found along roadsides and on old Amerind shell mounds. Kral & Redfearn say that it is "rare on wet sandy-peat of pondshores" in Florida. In

North Carolina collectors have found it along railroads and at railway stations, in waste places, about homesites, along roadsides, and on savannas.

The G. L. Fisher 48132 at Göteborg, cited below, is definitely V. brasiliensis!

Perry states that this is "A species very similar in habit to V. litoralis, but readily distinguished by the differences in inflorescence. The spikes of V. brasiliensis are short, compact, sessile, and regularly arranged in open cymes, whereas those of V. litoralis are longer, compact or somewhat elongate, peduncled, and arranged in more or less paniculate cymes."

Common names recorded for V. brasiliensis include "Brazilian vervain", "camaradinha", "erva de pai caetano", "formosa sem dote", "herva do pae caetano", "jurupeba", "oi", "quininha", and "verbena". The last-mentioned, however, is applied also to the genus as a whole, as well as to V. bonariensis L., V. bracteata Lag. & Rodr., V. corymbosa Ruíz & Pav., V. hastata L., xV. hybrida Voss, V. litoralis H.B.K., V. officinalis L., V. peruviana (L.) Britton, V. platensis Spreng., V. stricta Vent., V. urticifolia L., Bouchea prismatica (L.) Kuntze and its var. longirostra Grenz., Clerodendrum fragrans var. pleniflorum Schau., Priva lappulacea (L.) Pers., Stachytarpheta calderonii Moldenke, S. cayennensis (L. C. Rich.) Vahl, S. frantzii Polak., S. guatemalensis Moldenke, and S. jamaicensis (L.) Vahl.

Sampaio & Peckolt (1943) reduce V. brasiliensis to synonymy under V. litoralis, as do also Hooker & Jackson in the "Index Kewensis" (1895), while Schauer (1847) reduces it to a mere variety of V. litoralis. The two species are, however, reasonably distinct. The following brief key will help to distinguish V. brasiliensis from its immediate relatives:

1. Leaves sessile, clasping at the base.
   2. Leaves small, 2—4.5 cm. long, 3—8 mm. wide, subcoriaceous, serrate at the apex only or entire; pubescence on rachis, bractlets, and calyx glandulose.....V. intermedia.
   2a. Leaves large, 5—10 cm. long, 5—22 mm. wide, coarsely serrate from base to apex, membranous; pubescence on rachis, bractlets, and calyx not glandulose.....V. bonariensis.

1a. Leaves distinctly petiolate or cuneately attenuate to a subpetiolar base.
   3. Inflorescence lax, elongate; flowers distant; pubescence on rachis, bractlets, and calyx very minute and closely appressed.....V. litoralis.
   3a. Inflorescence dense, contracted; flowers mostly closely congested; pubescence on rachis, bractlets, and calyx spreading.....V. brasiliensis.

Glaziou (1911) calls his no. 14162 "Verbena littoralis H.B.K." and 14162a "V. intermedia Gill. & Hook.", but the former of these numbers is herein cited as V. brasiliensis. Villafañe describes

the flowers on his no. 970 as "amarilla", but this must surely be an error. The printed label for the Congdon s.n. [Sept. 2nd 1903] collection cited below is inscribed "Plants of Mariposa Co.", but Bouldin Island is located at the mouth of the San Joaquin River in San Joaquin County, California. Killip & Garcia on the label of their no. 33849 report that the species is used in the treatment of typhoid fever in Colombia, but this collection looks very strange -- it is very leafy, like some forms of V. glabrata H.B.K., yet its inflorescences are very pubescent. Hammarlund 631 has much of the aspect of V. parvula Hayek and may prove to be that species. Tate 206, from an altitude of 12,000 feet at Pongo, Bolivia, may prove to be V. hispida Ruíz & Pav. The Sprague s.n. specimen in the Kew herbarium is anomalous and may actually prove to represent V. litoralis var. caracasana (H.B.K.) Briq. Lutz 1185 is a mixture with V. litoralis, while Worth & Morrison 16498 is a mixture with V. bonariensis L.

Glaziou (1911) identifies his no. 356 as V. bonariensis, but it is actually V. brasiliensis. Specimens of this species have also been misidentified and distributed in herbaria as V. angustifolia Michx., V. bonariensis L., V. bonariensis var. brevibracteata Kuntze, V. bonariensis var. longibracteata Kuntze, V. ephedroides Cham., V. hastata L., V. hispida Ruíz & Pav., V. intermedia Gill. & Hook., V. isabellei Briq., V. litoralis H.B.K., V. litoralis Kunth, V. litoralis var. caracasana Briq., V. litoralis var. caracasana (H.B.K.) Briq., V. litoralis var. caracasana Kunth, V. littoralis H.B.K., V. officinalis L., V. officinalis var. gracilescens Kuntze, V. polystachya H.B.K., V. stricta Vent., V. venosa Gill. & Hook., and even Verbesina occidentalis Walt. On the other hand, the Hassler 7064, distributed as V. approximata, and the Hassler 6685, distributed as V. litoralis var. brasiliensis Briq., are both V. montevidensis Spreng.

Demaree states that "a large field develops in less than 5 years" in Arkansas; Ahles, in Alabama, found the species very abundant along railroad tracks and on dry savannas. In Mississippi Demaree found it "very common all along the coast", while Bailey calls it "a common weed" in Louisiana. In Texas it grows abundantly in black soil according to Warnock. Smyth affirms that in Peru it is the "common tall verbena of the valley, common along railroad tracks and between cane fields." In Minas Gerais, Brazil, it is said by Irwin to be found "in red clay soil, common especially in waste places"; Lutz found it "abundant" in Rio de Janeiro, and Bailey refers to it as a "weed" in the same state. According to Rosengurtt it is "common in swamps and fields" in Uruguay. Hunziker refers to it as "rare" at La Viña, Salta, and Pedersen says that it is "not common on wet sandy soil" in Corrientes, Argentina. Miss Mexia reports it as "common and widespread in hedgerows and cultivated fields" in Minas Gerais. In Chile, Elliot

says it is "eaten by cattle". Bryant tells us that in the Cape of Good Hope it is a "large regular but open growing bush 3 feet high and several feet in circumference." Fasciation is seen on Barros Valenzuela 8002 in the Britton Herbarium at New York. The Sprague s.n., cited hereinafter as from Meta, Colombia, may well have been collected in Cundinamarca -- its label merely states "between Villavicencio and Bogotá". The surname of the collector, Freyreiss, is misspelled "Freyreis" on some Stockholm sheets.

Illustrative of the difficulty of identification attending some specimens of this species is Rojas 1045 -- this specimen was originally named V. bonariensis by the collector; then as V. bonariensis var. brevibracteata by Hassler; then as V. litoralis by Osten, and finally as V. bonariensis var. veris, also by Hassler. Sanzin 274 was identified as V. littoralis by Hauman, Rojas 1887 as "V. litoralis Kunth vel affinis" by E. Almquist, and Herb. Osten 18497 as "V. littoralis Kth. ad V. bonariensem L. spectans" by Osten.

It is of interest to note that Small (1933) recorded the species from only Louisiana; Fernald (1950) extended the range in the United States from "Fla. to La. and n. to se. Va.", while in 1952 I further extended it to include Arkansas and southern California. This is apparently an index to the rate with which it is spreading in the United States.

Briquet (1904) cites Hassler 1027b and 1027d from Paraguay and Regnell A.475 1/2, A.3647, and A.3651 from Brazil. Fernald (1938) records the species from Warwick County, Virginia, while Kuhlmann & Kühn (1947) cite M. Kuhlmann 66 from São Paulo, Brazil. Ahles, Bell, & Radford (1958) cite Bell 2520 from Beaufort County, South Carolina.

Perry (1933) cites the following 28 additional specimens not as yet seen by me: NORTH CAROLINA: New Hanover Co.: Randolph 1004 (G); J. K. Small 5707 (E, G). GEORGIA: Chatham Co.: Kolthoff s.n. [27 May 1927] (W). FLORIDA: Escambia Co.: Curtiss 6490 (E, G, W); S. M. Tracy 8706 [E, F, G, W). Washington Co.: F. S. Blanton 6598 (E, W). ALABAMA: Mobile Co.: C. T. Mohr s.n. [4 July 1893] (W). LOUISIANA: Plaquemines Par.: Lloyd & Tracy 20 (E, F, G, W). By error she cites the Louisiana specimens under Alabama. What she cites as "Small 5707" seems to be Herb. Biltmore 5707, at least in the Britton Herbarium at New York, as well as in the University of North Carolina Herbarium.

In all, I have examined 513 herbarium specimens, including the type collections of many of the names involved, and 4 mounted photographs.

Citations: VIRGINIA: Warwick Co.: Fernald & Long 7585 (N). NORTH CAROLINA: Bertie Co.: Ahles & Duke 46161 (Hi--121529). Bladen Co.: Ahles & Haesloop 29296 (Hi--104730). Brunswick Co.: C. R. Bell 13163 (Hi--121530); Fox & Godfrey 2823 (N, No--19606); A. A. Heller 14065 (Du--157392, Se--85940). Buncombe Co.: Biltmore Herb.

1089b (Up--11832). Columbus Co.: C. R. Bell 12800 (Hi--110659). Jones Co.: Radford 37242 (Hi--104728). New Hanover Co.: C. R. Bell 12874 (Hi--110660); Biltmore Herb. 5707 (Hi--59468, N, N); Blomquist 4711 (H--19220), s.n. [Aug. 15, 1930] (Ob--70515); Randolph & Randolph 1004 (Ba); P. O. Schallert s.n. [Wilmington, 5-31-37] (Mn--29556, Sd--25691, Tr--19773, Vt); A. W. Totten s.n. [Fort Fisher, Sept. 29, 1935] (Hi--59487). Northampton Co.: Fox, Boyce, & Moreland 2097 (N); Fox & Godfrey 2279 (N). Onslow Co.: Ahles & Haesloop 28262 (Hi--104862). Pender Co.: Ahles & Haesloop 28062 (Hi--104861); Coker & Totten s.n. [July 17, 1932] (Hi--59482). Robeson Co.: Britt 2114 (Hi--177879). Scotland Co.: Ahles & Haesloop 28803 (Hi--104876). Union Co.: Ahles & Haesloop 27637 (Hi--104877). Wilson Co.: Radford 35706 (Hi--104878). SOUTH CAROLINA: Allendale Co.: C. R. Bell 3975 (Hi--92962). Bamberg Co.: Ahles & Haesloop 25938 (Hi--104732, Hi--104733). Beaufort Co.: C. R. Bell 2523 (Hi--92749). Berkeley Co.: Ahles & Haesloop 26670 (Hi--104731). Calhoun Co.: Ahles & Haesloop 25540 (St), 30276 (Hi--104729). Cherokee Co.: Ahles & Haesloop 26978 (Hi--164727); O. M. Freeman 56425 (Hi--92724). Chester Co.: O. M. Freeman 56406 (Hi--92933). Clarendon Co.: Radford 24392 (Hi--92911). Dillon Co.: Ahles & Haesloop 27677 (Hi--104865). Florence Co.: C. R. Bell 7486 (Hi--92852). Greenwood Co.: Radford 22964 (Hi--92912). Hampton Co.: C. R. Bell 2595 (Hi--92750). Horry Co.: C. R. Bell 7710 (Hi--92913). Lancaster Co.: Ahles & Haesloop 27233 (Hi--104864). Lee Co.: Radford 24184 (Hi--92915). Lexington Co.: Radford 23392 (Hi--92914). Marion Co.: C. R. Bell 6409 (Hi--92916). Marlboro Co.: Radford 15482 (Hi--92934). Newberry Co.: C. R. Bell 9820 (Hi--92853). Orangeburg Co.: Ahles & Haesloop 25203 (Hi--104863). Richland Co.: C. R. Bell 16326 (Hi--180053). Sumter Co.: O. M. Freeman 56809 (Hi--92935). Union Co.: O. M. Freeman 56402 (Hi--92856). Williamsburg Co.: Radford 21419 (Hi--92917). GEORGIA:: Chatham Co.: D. E. Eyles 7339 (Sz); Kolthoff s.n. [27 May 1927] (S); Miller & Maguire 1260 (Ua--16575). Glynn Co.: H. N. Moldenke 1184 (E, Go, H--5461, N, S, Up, Ur); Pyron & McVaugh 1424 (Gu--13995). FLORIDA: Escambia Co.: Curtiss 6490 (Ca--104820, Io--38750, N, Ur, Vt); Gander 7673 (Sd--25560); S. M. Tracy 8706 (N, Tr, Up--50342). Holmes Co.: Kral & Redfearn 2875 (Hi--111315). Leon Co.: R. K. Godfrey 53362 (Hi--155440, N). Taylor Co.: R. K. Godfrey 55781 (N). Washington Co.: F. S. Blanton 6598 (Ba, En, I, N, Po--215350, Um--22); O'Neill 6598 (N). ALABAMA: Escambia Co.: Ahles 7030 (Ur), 7158 (Ur); O. Blanton 114 (I). Mobile Co.: Demaree 33639 (Cb, Ss); Diener 637 (Tl); Shinners 11584 (No--21011). Sumter Co.: S. B. Jones s.n. [3 July '60] (Hi--210902). Dauphin Island: S. B. Jones 602 (Hi--210617). MIS-

SISSIPPI: Forrest Co.: F. H. Sargent s.n. [Hattiesburg, Sept. 7, 1932] (N). Hancock Co.: Demaree 29590 (N), 32987 (Le). Harrison Co.: Demaree 28385 (N), 29009 (N, Ok, St), 31897 (Le). Jones Co.: W. H. Rhoades s.n. [near Laurel, Sept. 1940] (N). Lee Co.: J. D. Ray 5871 (Hi—199698, N); B. Shelton 85 (St). Pine Co.: J. D. Ray 5434 (N). County undetermined: W. H. Rhoades s.n. [9-1940] (Bt—61223). LOUISIANA: Ascension Par.: Ashbey 42 (Tl), 92 (Tl). Assumption Par.: Perkins & Hall 2621 (Po—256899). East Baton Rouge Par.: C. A. Brown 1008 (N). Jackson Par.: Shinners 24016 (Ur). Jefferson Par.: H. P. Riley s.n. [Barataria, Apr. 27, 1937] (Or—44063). Lafayette Par.: Perkins & Hall 2622 (Um—25). Lafourche Par.: Ashbey 16 (Tl). Orleans Par.: L. H. Bailey 7324 (Ba); Cocks s.n. [May 1901] (Tl), s.n. [New Orleans] (Tl); Ewan 18738 (Tl); Langman 1940 (Up); H. P. Riley s.n. [Apr. 20, 1937] (En, Se—47522), s.n. [Apr. 25, 1937] (Se—47524); E. Wall 5 (Go), s.n. [New Orleans, 10/5/31] (Ew). Plaquemines Par.: Ewan 17474 (Au—121754); Lloyd & Tracy 20 (N); Tracy & Lloyd 20 (Cm). Saint Bernard Par.: Demaree 13493 (W—1699223). Saint Charles Par.: Ewan 17707 (Tl). Saint John the Baptist Par.: Ashbey 1a (Tl), 74 (Tl). Saint Martin Par.: S. W. Hutchinson 7878, in part (En). Saint Tammany Par.: T. F. Hall s.n. [April 30, 1939] (Tl). Tensas Par.: J. F. Brenckle 40180 (N). Terrebonne Par.: Arceneaux 394 (It); Ashbey 65 (Tl); Bynum, Ingram, & Jayres s.n. [Houma, April 23, 1923] (N); W. H. Rhoades s.n. [Houma, August 1936] (Bt—71463, Hs, N); Wurzlow s.n. [Houma, May 29, 1914] (N, N). Vermillion Par.: Ashbey 114, in part (Tl); Constantin 46 (Hi—188555). ARKANSAS: Chicot Co.: Demaree 25689 (Sm). Cleveland Co.: Demaree 23329 (Sm). Saint Francis Co.: Demaree 15103 (Gg—267610, Ok). TEXAS: Hardin Co.: C. L. Lundell 14083 (N). Harris Co.: Fitzgerald 8c (Bl—42347), 85 (Bl—42345); W. H. Lewis 5301 (Nb). Jefferson Co.: J. F. Brenckle 48073 (N); G. L. Fisher 51042 (Go); Harold Gentry 53-230 (Au—121743); C. L. Lundell 14136 (N). Liberty Co.: F. W. Gould 6925 (Au—121746). Orange Co.: Cory 50840 (N, Sm); G. L. Fisher 48132 (Go). Wharton Co.: Warnock 46420 (Au, N, Or—55399, S, Vi). OREGON: Multnomah Co.: Suksdorf 1980 (Pl—138401). CALIFORNIA: Amador Co.: J. T. Howell 29996 (Gg—338069), 30055 (Gg). Butte Co.: W. Anderson s.n. [Gridley, Oct. 1959] (Gg); J. T. Howell 30519 (Gg), 34611 (Gg). Eldorado Co.: Crampton 2020 (Gg—388055). Nevada Co.: M. S. Baker 9971 (N). Sacramento Co.: Crampton 2228 (Gg—389520, Gg—389573). San Joaquin Co.: Crampton 2260 (Gg—389519, Gg—389572), 2260a (Gg—390129). Solano Co.: Rattan s.n. [Wallace, Rio Vista] (Du—10001). Stanislaus Co.: Hoover 93 (Ca, Ca—767079); J. T. Howell 29912 (Gg—388070), 30107 (Gg), 32697 (Gg—

409322); Nobs & Smith 206 (Gg--417904); Wiggins 14369 (Du--409390, N). Sutter Co.: Everett & Balls 23904 (Hi--198835); Mason & Grant 13039 (Ca--192057). Yuba Co.: Crampton 4133 (Gg), 4134 (Gg); Raven 8080 (Gg); L. S. Rose 39200 (Al, Bt--51937, Ca--882583, I, Mi); C. B. Wolf 1437 (Ba, Du--231426). Bouldin Island [San Joaquin Co.]: Congdon s.n. [Sept. 2nd, 1903] (Ca, Ca--138821). MEXICO: Michoacán: Feddema 23 (Mi). Nayarit: Feddema 583 (Mi). JAMAICA: Orcutt 2736 (Du--206013). COLOMBIA: Caldas: Dryander 2751 (N). Cundinamarca: V. Grant 7352 (W--1802322). Huila: Pérez Arbeláez & Cuatrecasas 8361 (Jc). Meta: T. A. Sprague s.n. [between Villavicencio and Bogotá] (K). Santander: Killip & Smith 17340 (N). Valle del Cauca: Killip & García 33849 (W--1770719). PERU: Cajamarca: Woytkowski 1751 (N). Cuzco: Hammarlund 631 (S). Huánuco: Sandeman 3486 (K). Junín: A. S. Kalenborn 160 (Du--103207); Kalenborn & Kalenborn 160 (N); Ochoa 121 (N). La Libertad: Ochoa 1444 (N); Smyth 6 (N). Lima: Ellenberg 13 (Ut--115378b). BRAZIL: Federal District: Harrison s.n. (Br); B. Lutz 578 (Ja--24126), s.n. [Rio de Janeiro, May 1926] (Ja--15901), s.n. (Ja--46519); Moldenke & Moldenke 19591 (N). Minas Gerais: Ackermann 2831 (Br); Bailey & Bailey 1212 (Ba); J. F. de Castro 43 (Sp--31291); P. Clausen s.n. [Aug.-April 1840] (Br); Heringer s.n. [Herb. Esc. Agr. Lavras 283; Lavras, Nov. 8, 1939] (N, Sp--42464); Irwin 2116 (N, W--2281271); Macedo 2889 (N); Mello Barreto 8140 [Herb. Jard. Bot. Bello Horiz. 23376] (N); Mello Mattos s.n. [Itabira do Campo, June 1902] (Ja--46555); Mexia 5275 (Gg--286630, Go, I, Mi, N, S, Vi); Regnell I.326 [Nov. 19, 1864] (Ja--14845), II.210 [7-1-1874] (S), s.n. [Caldas, 1864; Herb. Rio de Jan. 14845] (N); Sampaio 138 (Ja--46499), 244 (Ja--46500), 5971 (Ja--46509), 6006 (Ja--46510), 6023 (Ja--46511); Widgren 1211 (Br), s.n. [1845] (Lu, N, S); L. O. Williams 5002 (G, N). Paraná: Dusén 14320 (S), s.n. [Herb. Rio de Jan. 31553] (N); Hatschbach 3749 (Sm), 3753 (Sm); R. B. Lange 1110 [Hatschbach 4757] (Sm); Moure 989 [Herb. Mus. Paran. 1879] (Mp); Stellfeld 1288 [Herb. Mus. Paran. 2538] (N). Rio de Janeiro: Ackermann 1033 (Br, Br); N. J. Andersson s.n. [1851] (Lu, S, W--1323145); Bailey & Bailey 569 (Ba); Dusén s.n. [Rio de Janeiro, Julio] (La); Glaziou 356 (Br, Br), 14162 (Br, N); P. P. Horta Laclette s.n. [Ipiabas, Feb. 1943] (Ja--37435); B. Lutz 1185, in part (N), s.n. [Herb. Rio Jan. 24126] (N); Raben 521 (Br), 522 (Br); Sampaio 72 (Ja--46498), 1980 (Ja--46502), 3899 (Ja--46506), 7924 (Ja--46518); J. Vidal s.n. [Maticá, March 24--26, 1943] (Ja--39278); Warming s.n. [Rio de Janeiro] (S). Rio Grande do Sul: Reineck & Czermak 63 (S); Sehnem 4470 (B). Santa Catarina:

Reitz C.821 (Le); Reitz & Klein 292 (N), 1206 (Gg, Sm). São Paulo: Brade 5737 (Sp--6729); Campos Novaes s.n. [Campinas] (Sp--1977); Campos Porto 36 (Sp--15730); A. Carvalho 190 (Ba); Costa & Viégas s.n. [Herb. Inst. Agron. Est. 234] (N, Sp--31016); Edwall s.n. [Pirituba, Oct. 30, 1893; Herb. Comm. Geogr. & Geol. 654] (Sp--15728); Emelen 121 (Sp--28929); Freire & Azevedo s.n. [Herb. Rio Jan. 31561] (N); Hashimoto 42 [Herb. Jard. Bot. Rio Jan. 42711] (N), 285 (Sp--42920); F. C. Hoehne s.n. [Alto de Serra, Jan. 10, 1919] (Sp--3035); W. Hoehne 242 (N); Leite 3725 (El); Löfgren s.n. [Sorocaba, May 25, 1887; Herb. Comm. Geogr. & Geol. 251] (N, Sp--15714); Moldenke & Moldenke 19667 (Es, Lg, Mg, N, Ot, Sm); Pickel 4320 (Sp--40189), 5459 (N); Russel 27 (Sp--20060); Usteri s.n. [Barra Funda, Oct. 24, 1905] (N, Sp--15733); Venâncio 2018 (Hk). State undetermined: Freyreiss s.n. [e Brasilia] (S); G. Gardner 233 (N); Martius 1033 (M); Sampaio 3894 (Ja--46504), 3896 (Ja--46505); Sieveking 6 (S). BOLIVIA: Cochabamba: Kuntze s.n. [Cochabamba, III.92] (N). La Paz: Asplund 444 (S, Us), 812 (Us), 1259 (S, Us), 1564 (S); M. Bang 8, in part (Pa), 136 (C, Ka, Pa); Buchtien 136 (V), 310 (N), 354 (V); G. H. H. Tate 206 (N). Tarija: Pflanz 2021 (W--1234313); Steinbach 1630 (N). Province undetermined: G. H. H. Tate 865 [Okara to Ancoma] (N). PARAGUAY: Hassler 3135 (Ca--944362), 3853 (N, N), 4887 [Macbride photos 24679] (Kr--photo, N, N--photo), 11539 (S, W--1056970); Jörgensen 3767, in part [Herb. Osten 22248] (N, N, S, Ug); Morong 128 (C); Ponder s.n. [Asuncion] (Je--7614); T. Rojas 1045 [Hassler 2409; Herb. Hicken 45; Herb. Osten 7538] (N, Ug), 1877 [Herb. Hort. Parag. 10069; Herb. Osten 13562] (S, Ug), 1887 [Herb. Hort. Parag. 10072; Herb. Osten 13557] (Ug), 2522 [Herb. Osten 18180] (N, Ug). URUGUAY: Berro 8471 (N); Cabrera 3890 (N); Gallinal, Aragone, Bergalli, Campal, & Rosengurtt B.765 1/3 (Ml, N); Herter s.n. [Herb. Osten 18497] (Ug); Kuntze s.n. [Montevideo, 7/12/1891] (N); Osten 4293 (Ug), 22921 (S, Ug); Rosengurtt B.865 (N), B.3364 (N). CHILE: Colchagua: Barros Valenzuela 8047 (N). Concepcion: Barros Valenzuela 8045 (N); Junge 2323 (Ba); Scott Elliot 77 (N, Pr). Coquimbo: Barros Valenzuela 8002 (N); Looser 4219 (N); Worth & Morrison 16380 (Ca--629836), 16498, in part (Ca--631730). Curicó: Barros Valenzuela 8051 (N), 8227 (N), 8228 (N), 8229 (N). Malleco: Kunkel 270 (Sm). Santiago: Looser 4381 (N); Moldenke & Moldenke 19760 (Es, Lg, N); Pählman s.n. [Los Nogales, 28/1/1913] (Lu). Valdivia: Hollermayer s.n. [Werdermann 1362] (Gg--149904, Ut--91273). Valparaiso: Behn s.n. [14 Dec. 1930] (Ca--446698). Province undetermined: Guzman 22 [Herb. Mus. Nac. Hist. Nat. Chile 59934] (N). ARGENTINA: Buenos Aires: R. Alvarez 190 (S), 228 (Ca--166257), 311 (S), 503 (S); Aurelius s.

n. (S); Cabrera 2159 (N, S); Cannelle s.n. [Punta Lara, IV.1943] (Mv), s.n. [San Isidro, 10.X.1943] (Mv); G. Dawson 865 (N), 918 (N); Floyer 48 (C); Hauthal 649 (N); Née 115, in part (Q); Rodríguez Vaquero 417 (S); Rodrigo 2224 (N); Ruiz Huidobro 1473 (S); Troncoso 195 (N). Catamarca: Cabrera 1186 (N); Luna Risso 935 (N); Pierotti s.n. [Merced, 19/2/44] (Ca); Villafañe 1222 (N), 1263 (N). Chaco: A. G. Schulz 1485 (N). Córdoba: Balegno 1096 (N, N); José Gutierrez 232 (N); Lorentz 131 [Macbride photos 20316] (Br, Kr--photo, N--photo), B.1 (Vt), s.n. [Estancia Germania, June--Dec. 1874] (Sg--68310); Osten 13110 (Ug), 13112 (Ug); Villafañe 335 (Gg--352670), 517 (N). Corrientes: T. Meyer 6616 (Ut--72507b, Ut--115409b); Pedersen 1911 (N, S). Entre Ríos: T. Meyer 10098 (N), 10155 (N). Jujuy: O'Donell 2914 (Gg--406037, S). La Rioja: T. Meyer 4245 (Ca--77209). Mendoza: Carette 3050 (N, N, Ug); G. Dawson 966 (N); E. M. Garcia 5 (N, Ok); Jensen-Haarup s.n. [Santa Rosa, 1905] (S); O'Donell 1067 (Ut--115419b).

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BOOK REVIEWS

Alma L. Moldenke

"The Story of Pollination", by Dr. J. D. Meeuse, illustr. by Hilda Kern, 243 pp. Ronald Press, New York. $7.50.

There is much here to delight the hearts and minds of readers of all ages and of little or much biological training. There is careful organization of the subject matter, baited with captivating chapter titles like "Flashing Beauties and Dashing Flyers", "Unbidden Guests Beware", and "Of Sausage Trees and Bats".

Actually, the reading of these stories leaves one with the feeling of having a ringside seat at a circus of fascinating nature adventures. For all the story-telling the scientific content is accurate, definitely valuable, and is good leavening for one's own orientation or for one's teaching of young people from kindergarten through college levels.

The text is enriched with quotations from some of the works of such outstanding scientists as Darwin, Fabre, von Kerner, Koelreuter, and Rumphius. It is also enriched with several of the childhood memories of the author, who lived at the Buitenzorg Botanical Garden in old-time Java. Just imagine the wonderful things that his childish eyes beheld! Then imagine the interesting questions and ideas that the great scientists working there must have directed his way, along with a pat on the head or a smile! The illustrations consist of several clear-cut, helpful, attractive drawings and a few fine photographs that do much to

clarify the text. Unfortunately two labels were interchanged in figure 28, but the clear text and legends prevent any serious confusion for the readers. A fine bibliography of wide scope is given.

The pollinating work of the skillful hymenopterans and lepidopterans, of water that floats the dry pollen of some aquatic plants, of early spring winds wafting prairie and forest pollens from inches to miles upon miles, of bats on sausage trees, of hummingbirds and their counterparts in other parts of the world, and of the flowers themselves when they resort to "last chance" or cleistogamous self-fertilization and to pseudocopulation patterns, is all effectively described. The "blundering beetles" perhaps have been belittled somewhat unfairly. These ancient pollinators of the plants of the geological past never did develop the tubular sucking mouthparts of the more efficient insect pollinators, but so many in both numbers and kinds of these strong coleopterans are found on flowers at mating times with their backs and legs heavily laden with pollen that they must be accredited.

There is an interesting discussion of wind pollination as a derived rather than a primitive condition. Experiments on colors, patterns, odors, shapes and structural deterrents involving insect pollinators and non-pollinators are convincingly described.

The price seems quite high for a book of this small size.

"Tree Growth", edited by Theodore T. Kozlowski, 442 pp., illustr. Ronald Press, New York. $12.00.

This book is an outgrowth of what must have been an unusually worthwhile group of sessions at the International Conference on Forest Tree Growth held at the University of Arizona in 1960.

Each author has made outstanding contributions in his field. Each article is clearly explained, well documented, and provided with comprehensive bibliographies. The editor himself has previously been well recognized for his valuable text "Physiology of Trees".

This work is definitely not to be confused with published records of some other conferences, where much coverage is given to small items which introduce young scientists to their confreres and are necessary to justify their travel allowances.

Typically there are good charts, diagrams, and photographs enriching the text. I was particularly impressed with the photograph of the "pancake" root system on p. 34.

Very many aspects of tree growth are discussed in concise text form running the gamut from genetics to dendrochronology, mensuration, taxonomy, climate effects, soil chemistry, mycorrhizal influences, root grafting, anatomical development and specialization, and physiological problems of auxins, photoperiodicity, photosynthesis, and mineral nutrition.

The book is dedicated to the great man of American forests, A. E. Douglass, and it is a very worthy tribute to a very worthy scientist.

NOVELTIES IN THE FLORA OF SANTO DOMINGO (HISPANIOLA) II

José de Js. Jiménez [1]

Regarding the large collections of plants of the Island of Santo Domingo (Hispaniola) deposited in herbaria such as the Gray Herbarium of Harvard University in Mass., the Smithsonian Institution of Washington, the New York Botanical Garden, to cite but a few among the most important, three main facts become self-evident to any student devoted to our Flora, namely:

1. New records of already known plants not yet published, as far as I am informed;
2. Many misidentified specimens; and
3. A lot of non-identified specimens, many in sterile stage, waiting for a careful study or requiring further collections, both in flower and fruit to determine accurately whether they are actually new records or new species.

These facts represent huge difficult problems requiring more adequate collections, garnering more capable students, and bearing in mind sane criteria for the modern status of our genera and species.

A short stay in the Gray Herbarium and Smithsonian Institution sometime during last June and July has given me the opportunity to take a look at a few of the unpublished records of Hispaniolan plants. The purpose of this paper is to enlarge, for a better knowledge of our flora, the list of phanerogams existing now-a-days in the whole Island.

At the same time I have selected for my Supplement a small new lot of comb. nov. because of transferring the Anastraphia spp. to the genus Gochnatia.

While visiting the Gray Herbarium of Harvard University two years ago I found out that Roy Jervis had annotated many of the Anastraphia sheets under the genus Gochnatia. I wrote to Mr. Jervis asking him to inform me about his decision to publish them sometime in the future. I had no answer. I found that Dr. Howard made the transfer to Gochnatia oligantha (Urb.) Howard (Journ. Arn. Vol. XLII, 2: 137 (1961), during a talk at his home last June, and so I decided to publish the new combinations.

I am greatly indebted to Dr. Howard and Mr. Garay of the Arnold Arboretum and Oakes Ames Herbarium respectively and to Mr. Emery C. Leonard of the Division of Phanerogams of the Smithsonian Institution of Washington for their kindness in allowing me to study the specimens cited in this paper and for their efforts to make my unforgettable stay with them a very delightful one.

1-Taxonomist of the Instituto Botánico "RAFAEL M. MOSCOSO". UNIVERSITY OF SANTO DOMINGO, Dominican Republic.

Orchidaceae

In the up-to-date and recent Schultes' "Native Orchids of Trinidad and Tobago", page 93, in the geographic distribution of Hexisea reflexa (Lindl.) Reichb. f., he cites Hispaniola among the countries where it has been recorded.

A careful search in the botanical literature dealing with Hispaniolan floras was entirely negative. So, the natural question is where did Schultes find this "unrecorded" record?

During my last visit to the Oakes Ames Herbarium of Harvard University, June 5-8, Dr. Garay and I found the correct answer. We found in the folder of the Hexiseae two specimens corresponding to two different records in the Dominican Republic and Haiti, viz: DOMINICAN REPUBLIC: La Cumbre, in forest, Cordillera Central, Santo Domingo Province, c. 300 m., 5. V. 1929, Ekman H-12374. Herbarium Oakes Ames No. 45126. Det. Mansf., 1930. HAITI: On Guarea trichilioides, Rivière Glace, 2200 feet, May 7, 1949; J. T. Curtis H-20. Herb. Oakes Ames No. 64210. Det. Schweinfurth.

Dr. Leslie A. Garay in his monumental work "Venezuelan Orchids", page 372, 1959, prefers the binomial Reichenbachanthus reflexus (Lindl.) Brade.

SPIRANTHES CALCARATA (Sw.) Jiménez, comb. nov.
Neottia calcarata Sw. Flor. Ind. Occ. 3: 1413 to. 28 fig. c. 1806.

SPIRANTHES LAXIFLORA (Ekm. & Mansf.) Jiménez, comb. nov.
Cyclopogon laxiflorum Ekm. & Mansf. in Ark. foer Bot. 22A. 8: 11. 1928.

Compositae

During one of my professional trips to the capital I noticed among the trimmed grasses of the lawns of different residences and also in waste land a very common prostrate Compositae with small yellow heads entirely unknown to me. My curiosity became aroused. I picked up several specimens and at home examined them very thoroughly. There was no doubt but that they belonged to the tribe of the Heliantheae.

To my surprise, none of the genera of our flora could adequately match my little plants.

They were then sent to the Division of Phanerogams of the Smithsonian Institution for study by Emery Leonard and Dr. L. B. Smith who found them to be the Mexican Blainvillea tampicana (Less.) Benth. & Jackson.

In N. Am. Flora, Series II, part 2, page 4 (1955) Edward Johnston Alexander includes this name in the synonymy of Calyptocarpus vialis Less.

The geographic distribution ranges from the southern United States, Central America, south to Cuba.

The new record of this species is as follows: DOMINICAN REPUBLIC: Ciudad Trujillo, Distrito Nacional, Jiménez 4076.

On September 28, 1958, at 1000 m. above sea level, in Monte Colorado, near La Placeta, Santiago Province, I collected my No. 3849 which, no doubt, belongs to the genus Eupatorium.

Matching the descriptions of all the species recorded in the list of the said genus in Santo Domingo, no one of them corresponded to my specimen. It was identified by Mr. Leonard as Eupatorium nervosum Sw.

The description given by de Candolle in his Prodromus V: 169 (1836) as well as the one in Fawcett & Rendle, Flora of Jamaica, vol. VII, part V (1936) matched my plant thoroughly.

Urban in Fedde, Rep. XVII: 49 (1921) in a note on his E. gibbosum and reproduced in his Symb. Ant. VIII: 712 (1921) considered both species to be conspecific. Fawcett & Rendle are of the same opinion.

In the Smithsonian Institution where I stayed from the 3rd to the 6th of July, I had the opportunity of examining specimens belonging to both species and reached the conclusion that they are two different genuine species and that the only similarities between them are the generic characters.

This plant, Eupatorium nervosum, seems to be a rather common one, considering the many sheets existent in the herbarium of the Smithsonian Institution, namely: DOMINICAN REPUBLIC: Loma Bajita, San José de las Matas, Santiago Province, E. J. Valeur 904. Barahona, Fuertes 447. Monte Colorado, La Placeta, Cordillera Central, Santiago Province, Jiménez 3849. HAITI: Pine Forest, Mornes des Commissaires, Dept. de l'Ouest, Holdridge 858. Vicinity of Anse Galette, La Source, Gonave Island, Leonard 3055. Vicinity of Etroite, Gonave Island, Leonard 3330. Vicinity of Mission, Fond Varettes, Leonard 3618.

EUPATORIUM TRIPLINERVE Vahl. There is only one specimen of this plant in the herbarium of the Smithsonian, collected by Ekman and cultivated in a private garden at la Terrena, Samaná Peninsula. I have seen the same plant cultivated under the common name of DIAPALMA. It is used as a febrifuge and for different stomach diseases. The record for DOMINICAN REPUBLIC is Terrena, Samaná Peninsula, Samaná Province, Ekman H-14760.

GOCHNATIA BUCHII (Urb.) Jiménez, comb. nov.
Anastraphia buchii Urb. Symb. Ant. 5: 527. 1908.

GOCHNATIA OBOVATA (Urb. & Ekm.) Jiménez, comb., nov.
Anastraphia obovata Urb. & Ekm. in Ark. foer Bot. Bd. 23A. 11: 94. 1931.

GOCHNATIA PICARDAE (Urb.) Jiménez comb. nov.
Anastraphia picardae Urb. Symb. Ant. 3: 414. 1903.

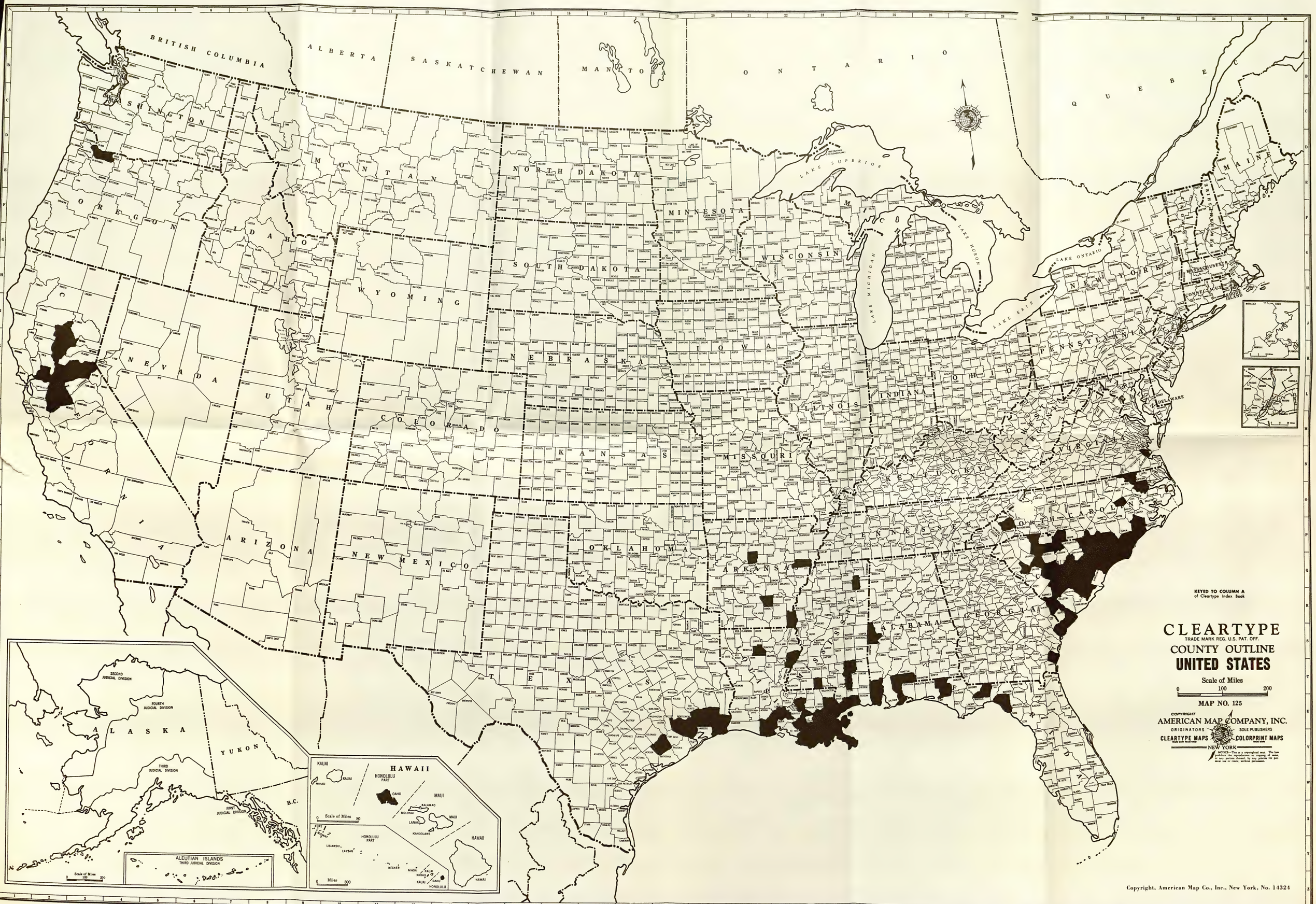
GOCHNATIA ROSEI (Britt.) Jiménez, comb. nov.
Anastraphia rosei Britt. in Bull. Torr. Bot. Club. 42: 385. 1915.

GOCHNATIA TORTUENSIS (Urb.) Jiménez, comb. nov.
Anastraphia tortuensis Urb. in Ark. foer Bot. Bd. 21A. 5: 96. 1927.

In conclusion, I hereby extend my best thanks to the two co-editors of Phytologia for their kindness in reading the manuscript of this paper and making valued corrections to the English text. To both of them my warmest gratitude.

Figure 6. Distribution of Verbena brasiliensis in the United States

Mapping by counties done by Andrew R. Moldenke



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ANACARDIACEAE: Rhoideae: Lithraea*

Fred A. Barkley

Of the approximately 38 genera of the tribe Rhoideae there are four which have stamens twice as many as the petals, the tricarpellary ovary one-celled, and have a disk between the stamens and ovary: Lithraea, Mauria, Schinus and Pachycormus. Lithraea differs from the other three in that it has basal seed and the leaves have a prominent white corneous margin.

The first entity of this genus to be known was apparently described by Molina as Laurus caustica in his Saggio Storia Naturale del Chile 176, in 1782 as "Laurus fol. ovalibus rugosis perennantibus, flor. quadrifidis". Vellozo described an entity from Brazil in 1825 as Schinus molleoides and this was followed by the description in 1833 of Schinus ternifolius Gillies ex Hooker & Arnott, two entities variously treated, but historically mostly treated as synonymous.

In 1826 Miers published Lithraea venenosa in Trav. in Chile 2: 529, thereby establishing the genus Lithraea, by which name these species have been consistently known since that time.

The genus is represented by southern Brazil, Paraguay, Bolivia, Uruguay, Argentina and Chile by a series of polygamo-dioecious poisonous-sapped trees.

LITHRAEA Miers

Miers, Trav. in Chile, 2: 529. 1826.
Endl., Gen. 1130. 1840.
Walp., Rep. 1: 551. 1842.
Lindl., Veg. King. 467. 1847.
Blume, Mus. Bot. Lugd. 1: 15. 1850.
Bentham & Hooker, Gen. Plant. 1: 418. 1862.
Marchand, Rev. Anacard. 9, 182. 1869.
Engler in Martius & Eichler, Fl. Brasil. 12^2: 394. 1876; in de Candolle, Monogr. Phaner. 4: 345. 1883; in Engler und Prantl, Nat. Pflanzenfam. 3^5: 164. 1892.

* The author wishes to express his appreciation to the American Philosophical Society for a grant which permitted him to visit the more important South American herbaria and to the directors and curators of these herbaria and those from which material has been sent on loan for study. The basic studies for this revision were made at the Fundacion Miguel Lillo de la Universidad Nacional de Tucuman. The writer is grateful to the rector, Dr. H. R. Descole, to the late director, Dr. Carlos O'Donell, and to his colleagues in the Botanical Institute for the facilities for study and for their suggestions and encouragement during the study.

Cabrera, Rev. Museo La Plata n.s. 2: 35. 1938; Rev. Argent. Agron. 6: 104. 1939.

Lithrea Gay, Flora Chilena 2: 43. 1846.
Lithrea Hook., Bot. Misc. 3: 175. 1833.

Trees with poisonous sap and slender branches. Leaves alternate, coriaceous, simple, ternate or pinnately 5-foliolate, the compound leaves with narrowly alate rachis and often alate petiole. Panicles usually lateral but clustered in the axils of the uppermost leaves, rarely terminal. The bracts deltoid and caducous. Pedicels usually glabrous above the abscission plate. Calyx usually with 5 semicircular or broadly deltoid lobes, glabrous except the margin of some ciliate. Petals usually 5, valvate, lanceolate, acutish, glabrous. The stamens twice as many as the calyx lobes, in staminate flowers slightly shorter than the petals, the anthers oblong, filaments as long as the anthers or with the alternate ones slightly shorter, in the pistillate flowers 1/2 to 1/3 as large and the anthers completely sterile. The disk with as many lobes as the stamens. The pistil in pistillate flowers with three hemispherical stigmas, one style, and a subspherical ovary with one cavity and one basal ovule, the staminate flowers have much smaller and abortive pistil with two points to each stigma. The fruit has whitish epicarp readily separating from the dark resinous mesocarp, the mesocarp adhering to the bony, smooth to rough endocarp.

Type species: Lithraea venenosa Miers, Trav. in Chile 2: 529. 1826 (- Lithraea caustica (Mol.) Hook. & Arn.)

The two major problems which confronted the present author were the specimens of the mountains of northwestern Argentina and those from northeastern Argentina which have traditionally been treated as conspecific and a series of specimens from northeastern Argentina to southern Brazil which have been variously segregated.

In regard to the first problem, after a study of the specimens it has seemed better to segregate the Bolivian-Argentinian series of tall trees with large fruits as specifically distinct from the similar but smaller trees with smaller fruits from the lower tropical regions. This mountainous species was first described by Gillies and published by Hooker and Arnott as Schinus ternifolius and later described as Lithraea Gilliesi Gris. The other major problem involving a complex of the tropical regions, has been treated as two or three distinct species: one a simple-leaved species L. brasiliensis March. only mor or less separable from the one or two pinnately compound leafed species. The pinnately compound-leafed species, Lithraea molleoides (Vell.) Engl., is a plant with leaflets lanceolate-oblong and obtuse. This is common in southern Brazil. In northeastern Argentina is a plant with linear-lanceolate acuminate leaflets, which Hieronymus named Lithraea Lorentziana. It has been included in Lithraea molleoides by most authors and is united to that species by a large series of intermediate specimens. To the author it appears that there are three entities with some intermediates. The three entities which may well represent specific elements

or cytogenetic studies may show that they are three variations of a single species. At present it seems to the writer best to treat them as two species and one variety, although Lithraea brasiliensis is scarcely better differentiated from Lithraea molleoides than Lithraea molleoides var. Lorentziana.

KEY TO THE TAXA

1 Leaves simple or mostly so.

2 Leaves ovate, heavily coriaceous, the margins entire or slightly irregular, inclined to be scalloped; fruit large: Chile.

3 Leaves and branches glabrous, leaves often larger and more coriaceous, the margin more scalloped.
4. LITHRAE CAUSTICA

3 Leaves and branches pilose, leaves usually smaller and slightly thinner and less scolloped.
4a. LITHRAEA CAUSTICA var. PILOSA

2 Leaves oblong or ovate-lanceolate, the margin entire or irregular, rarely scolloped; fruit small: Brazil and Argentina.
1. LITHRAEA BRASILIENSIS

1 Leaves compound or mostly so.

2 Fruit small, 4.5-5.5 mm. in diameter; lowlands of northeastern Argentina to Brazil.

3 Leaflets usually ovate-lanceolate, usually obtuse but often acute.
2. LITHRAEA MOLLEOIDES

3 Leaflets usually linear-lanceolate, acuminate. 2a. LITHRAEA MOLLEOIDES var. LORENTZIANA

2 Fruit large, 7-9 mm. in diameter; highlands of western Argentina and Bolivia.
3. LITHRAEA TERNIFOLIA

1. Lithraea brasiliensis March., Rev. Anacard. 185. 1869.

Ehretia venulosa Spreng. ex Engl. in Mart. & Eichl., Flora Brasil. 12: 395. 1876, in synon.
Lithraea australiensis Engl., Engl. Bot. Jahrb. 1: 422. 1881; Engl., in de Candolle, Monogr. Phaner. 4: 347. 1883, in syn.
Lithraea verrucosa Miers ex Engl. in de Candolle, Monogr. Phaner. 4; 347. 1883, in syn.

Evergreen tree of 7 or 8 m.; branches slender, glabrous or sparsely puberulent, grayish brown; the leaves simple, or leaves

in part with leaflets 2, 3 or 5, leaves thinly coriaceous, the margin white, entire or somewhat irregular, glabrous or very sparsely puberulent on the veins, obtuse at apex or rarely subacute, cuneate at base and decurrent on the 4 to 10 mm. long petiole, 4 to 9 cm. long, 12 to 30 mm. broad, the compound leaves with leaflets sessile, similar to the leaves, the petiole and rachis winged; inflorescences axillary panicles mostly clustered near the apex of the branches, about 5 to 10 cm. long, with the branches of the inflorescence sparsely puberulent; bracts caducous, deltoid, often one larger (5X7 mm.) and two smaller bracts (2 X 4 mm.) clustered together, glabrous except for a few cilia on the margins; pedicels about 1.5 mm. long, sparsely pilose-puberulent below, glabrous and shining above, in fruit to 3 mm. long; sepals 5, rounded-deltoid, glabrous, margin more or less irregular and with very few cilia, 1 X 1 mm.; petals glabrous, obovate, obtuse to subacute, 1 X 2 mm.; stamens 10, anthers 1 mm. long, filaments 1 mm. long; disk 1.5 mm. in diameter; pistil with stigmas 3, flaccid, .2 mm. in diameter; the pistillate flowers with petals .7 X 1.8 mm., stamens with anthers sterile, .5 mm. long, filaments slender .5 mm. long, the disk 1.2 mm. broad, less lobed than in the staminate flowers, the three stigmas large, the style .4 mm. long and the ovary spheroid, 1 mm. in diameter; fruit 4 to 5 mm. in diameter, slightly flattened, style persistent and brownish, epicarp creamy yellow, readily separating from the thin resinous mesocarp; seed lenticular, slightly larger at one end, 4 mm. wide, 5 mm. long, 2.2 mm. thick, essentially smooth, brownish black.

TYPE: Gaudichaud 925 from Sao Paulo, Brazil, in the Paris Herbarium.

The range of the species is from Minas Geraes, Brazil to Misiones, Argentina.

Common names: "Aruera", "Salitre", "Laurel del Monte", "Molle de beber","Arbol malo", "Litre", "Aroeira Braba", "Pan de Bugre", "Braúna".

Specimens examined:-

BRAZIL: 1881, Glaziou 18199 (K); Ulissiponae, Martius s.n. (M) and 1820, s.n. (M); Riedel s.n. (K); Sello s.n. (S) and 19333 (NY); St.Hilare 134/5 (BM); MINAS GERAES: St. Hilaire 1762 (BM) and 1772 (BM). RIO DE JANEIRO: Cap. Frio, (BR); Cabo Frio, 18 Sept. 1881, Glaziou 12947 (F, US) and 12547 (R), and 1882, Glaziou 12549 (G, K); Cabo Frio, Sept. 1881, Netto, Glaziou y Schwacke s.n. (R); Cobacabana, strouch in der Restinga bei Cabo Frio, Oct. 1899, Ule 4714 (CORD, R); SAO PAULO: Sorocabana, Briga deiro Folios, 12 Dec. 1947, Betzler s.n. (RB); Gaudichaud 925 (BM--ISOTYPE); PARANA: Curityba, 25 Nov. 1903, Dusen 2229 (R), 1908, 6849 (S), Itaperussu, 18 Nov. 1908, 7144 (G, S), Curityba, 19 Oct. 1909, 8740 (S, US), Pinchaea, 13 Nov. 1911, 13353 (F, S), and Rio Capinzal, 29 Febr. 1916, Dusen 17883 (S); Sao Matheus, 26 Dec. 1929, Gunzel s.n. (RB) and 6 Nov. 1936, 16102 (RB); Curityba, Estacao Bariguy, 4 Oct. 1946, Hatschbach 421 (LIL, RB) Trancheira, 10 Oct. 1914, Jonsson 1112a (F, G, Mich, NY, S); SANTA CATHARINA: Herval, 8 Junio 1911, Dusen s.n. (S); 1837, Gaudichaud 269 (F, G, US)

Florianopolio, 16 Sept. 1145, Joao y Rohr 504 (LIL); Sombrio, 23 Nov. 1944, Reitz c708 (RB) and Sombrio, 10 m. alt., 19 Sept. 1945, C1227 (LIL); RIO GRANDE DO SUL: Miamao, Campo do Varejao, 25 Oct. 1945, Emrich 1167 (LIL); Sao Joao do Montenegro, Pareci-Novo, Oct. 1944, Eugenio 26570 (LIL); Sao Joao do Montenegro, Pareci-Novo, 16 Oct. 1945, Henz y Rambo 29655 (LIL); Sao Leopoldo, 20 m. alt., 10 Oct. 1946, Eugenio 35403 (LIL, S) and Oct. 1941, 3003 (GH); Porto Alegre, 3 Nov. 1892, Lindman a581 (S); Rio Grande, 29 Oct. 1901, Malme 63 (S), 30 Oct. 1901, 86 (S), Porto Alegre, 16 Dec. 1901, 860 (S) and Porto Alegre, 5 Nov. 1892, Malme 258 (S, US); Morro Sapucaia, 29 Jan. 1948, Palacios & Cuezzo 444 (LIL), Porto Alegre, Morro da Policia, 2 Febr. 1948, 607 (LIL), Tristeza, 3 Febr. 1948, 698 (LIL) and Porto Alegre, Tristeza, 3 Febr. 1948, Palacios & Cuezzo 740 (LIL, U); Cai, Morro Cauastra, 16 Mar. 1933, Rambo 1720 (LIL, SP), Morro da Gloria, 16 Oct. 1945, 29302 (LIL, S), Vila Manresa, 21 Oct. 1951, 51333 (US) and 10 Sept. 1945, 35515 (US), Porto Alegre, Morro da Gloria, Oct. 1944, 27097 (LIL), Sao Leopoldo, Sapucaia, 5 Sept.1945, Rambo 29486 (LIL), Sao Francisco de Paula, Vila Oliva, 8 Enero 1946, 31132 (LIL), Aprados da Serra, Bom Jesus, 1000 m. alt., Enero 1947, 35008 (S), Bom Jesus, Faz. Belem Velho, Jan.1947, 35403. (LIL), Porto Alegre, 2 Oct. 1948, 37793 (LIL), Garroupilha, 29 Jan. 1949, 40338 (LIL) and Porto Elegre, 30 Sept. 1949, 43667 (LIL), Sao Leopoldo, 17 Oct. 1949, 43915 (BAL), Lagoa dos Barros, Osorio, 24 Nov. 1944, 44509 (LIL) and Furna do Tigre, Itapoan, 19 Nov. 1949, Rambo 44500 (LIL); Belem Velho, Oct. 1897, Reineck & Czermak 140 (S,MG) and Arraial da Floria y Belem Velho, 31 Oct. 1897, 62 (G); von Thering 1 (R);

URUGUAY: Arechavaleta s.n. (CORD); Berro 883 (G, CORD); Feb. 1925, Duello Jurado s.n. (BA); CERRO LARGO: Sierra Tupamba, Dec. 1892, Arechavaleta s.n. (CORD); Cº de las Cuentas, 25 Febr. 1938, Rosengurtt B2583 (LP) and B2583E (LIL), and 29 Dec. 1938, B-2796 (LIL); FLORIDA: la Palma, Nov. 1934, Herter 1537c (US); Arroyo Mansavillagra: Picada Castro: Rincon de Santa Elena, Nov. 1946, Rosengurtt & Gallinal 5744 (LIL, S, US); LAVALLEJA: Sierra de Minas, Nov., Arechavaleta s.n. (CORD); Minas: Penitente, 200 m. alt., 1-2 Nov. 1931, Herter 1537A (F, G. U); MALDONADO: Piriapolis: Cerro del Toro, 10 Febr. 1933, Clos 4971 (BAB); Cerro de Animas, 7 May 1936, Legrand 809 (F); Sierra de Animas: Nov. 1922, Hauman s.n. (BA); Cerro de las Animas, 500 m. alt., Sept. 1934, Rosa 526 (BA, LIL); Punta Ballena: Bosque Lussich, 11 Febr. 1943, Rosengurtt B-4520 (LIL): ROCHA: San Vicente: 28 Jan. 1921, Wetmore 859 (US); TREINTA Y TRES: Tacuari, Nov. 1933, Herter 1537B (F, G. US) UC and 1537D (RB);

ARGENTINA: Misiones: San Pedro, 4 Nov.1886, Niederlein 713 (1591) (BA).

2. Lithraea molleoides (Vell.) Engl. in Mart., Fl. Bras. 12²: 394, t.83. 1887; Cabr., Rev. Museo de la Plata n.s. 2: 38. 1938, n.pr.

Schinus molleoides Vellozo, Florae Fluminensis 10: pl. 134.

1825.

Rhus clausseniana Turcz., Bull. Soc. Nat. Mosc. 1: 469. 1858, fide Engl. in DC. Monogr. Phaner. 4: 346. 1883.

Lithraea Aroeirinha March. ex Warm.in Kjoeb. Vidensk. Meddel. 61. 1873.

Schinus Molle Hort. ex Engler in DC., Monogr. Phan. 4:346. 1883.

Schinus leucocarpus Mart. ex Engl. in Mart. & Eichl. Fl.Bras. 12^2: 394. 1887.

Schinus brasiliensis March.ex Cabr., Rev.Museo de la Plata n.s. 2: 41. 1938, pr.p.

Tree 3-5 meters tall with slender branches at first tan, finely and (usually) densely puberulent, later glabrate and creamy-tan; leaves ternately compound, or rarely 5-foliolate or very rarely some simple, leaflets sessile, thinly coriaceous, terminal usually slightly larger, 6-7 cm. long, 1.8-2.2 cm. broad, lateral 3-5.5 cm. long, 1.5-2 cm. broad, ovate to ovate-lanceolate, mucronate, typically rounded obtuse, but often subacute to acuminate, base broadly to narrowly cuneate,entire to slightly irregular, rachis 1.3-1.7 cm. long, alate, petiole 1.5-3 cm. long, narrowly winged in the upper half; panicles erect, lateral and axillary, clustered near the apices of the branches, or rarely terminal, shortly pilose, 5-6 cm. long; bracts caducous, broadly deltoid, sparsely pubescent on outer surface, sparsely ciliate with simple hairs; pedicels 1 mm. long, increasing to 2 mm. in fruit, pubescent below, glabrous above; calyx lobes very broadly deltoid, 1 mm. broad, .5 mm. high, glabrous except margin sparsely ciliate with simple hairs; petals lanceolate-ovate, 1.8 mm. long, .8 mm. broad, acutish, glabrous; stamens in the staminate flowers with filaments .8 mm. long, anthers oblong, .8 mm. long, in the pistillate flowers much smaller; disk about .8 mm. broad, lobes as many as the stamens; ovary in the pistillate flowers about .8 mm. broad, stigmas 3, style 1, in staminate flowers the pistil much smaller; fruit 5 mm. long, 5.5 mm. broad, 4 mm. thick, epicarp creamish, readily separating from the dark resinous mesocarp, the mesocarp adhering to the bony endocarp; the seed 3.5 mm. high, 2 mm. thick, and 4.5 mm. long, brownish, rough.

TYPE: Warming s.n., from Minas Geraes, Brazil.

Common names: "Aroeira branca", Aroeira brava", "Arroeira branca", "Aroeira miuda", Aruera","Aroerinha", "Anieira", Aroeira", "Chichita", "Molle Guazu".

Range: from Minas Geraes, Brazil, to Misiones, Argentina.

Specimens examined:- BRAZIL: Cuming s.n. (UPS) Glaziou 10486 (C) and 13679 (C), San Jose dos Campos, 8 Sept. 1909, Lofgren 339 (S); St. Ignacio, 1837, Pohl 1542 (NY); 25 Jan. 1859, Sello (W) s.n. (LISU, US) and 4887 (LISU, S); Goiania, alt. 700m., 20 Aug. 1944, Williams 8179 (LIL); MINAS GERAES: Sept. 1887, Arechaveleta s.n. (R); Lavras, 14 Aug. 1944, Black 154M (RB); 1838, Bois 88 (NY); Pontalate, 18 Jul. 1916, Campos 345 (RB); 1838, Claussen s.n. (NY) and 475 (NY, UPS), Lagoa Santa, Oct.

1839, s.n. (G), 93 (G) and 1841, Claussen 8 (NY); Jul. 1842, Gardner 4497 (G); Grei de Barbacena, 23 Jun. 1879, Glaziou 10486 (F. R. US); Prata, Triangulo Mineiro, 3 Sept. 1949, Labouriau s.n. (RB); Caldas, Sept.1854, Lindberg 421 (S); Bello Horizonte, Villa Novo Horizonte, 25 Jul. 1933, Mello 750 (F. R.); Bello Horizonte, Engenho Nogueira, 26 Jul. 1942, Magalhaes 3155 (BEL); Caldas, 20 Sept.1873, Mosen 338 (UPS, S) Sept. 1862, Netto s.n. (R); Caldas, 29 Feb. 1843, Regnell 63 (S, UPS, US), Caldas, Dec. 1846, II 43 (UPS), April 1847, II 63 (NY, UPS), Caldas, 5 Oct.1858, s.n. (US) and II 63 (S), July 1848, II 63 (NY, UPS), 1864, II 63 (R), 12 Sept. 1874, II 63 (UPS), and 1875, Regnell II 63 (UPS); 1822-1828, Riedel 541 (S, US); Rio das Vehas, 12 Sept., Schwacke s.n. (R); Lagoa Santa, 1 Sept. 1867, Warming s.n. (S--ISOTYPE); 1845, Widgren 1080 (BR, U, UPS) and Caldas, 1845, 1082 (S); Municipio de Belo Horizonte, Morro das Pedras, 1000 m.alt., 4-5 Sept. 1945, Williams & Azzis 7481 (LIL, US); SAO PAULO: Botucatu, Nov. 1896, Edwall s.n. (SP) and Rio Feio, 15 Nov. 1905, 159 (SP); 18 Sept. 1931, Handro 73 (F, NY) and s.n. (RB, SP) ; Chacara, Joao Jorge, 25 Aug. 1904, Heiner 161 (S); Butantan, 23 Aug. 1917, Hoehn s.n. (SP), 23 Nov. 1917, 942 (SP, US) and 18 Sept.1931, Hoehne 23801 (F); Cunha, 19 Oct. 1939, Kiehle y Franco s.n. (SP); Sierra da Cantareira, Koscinsky s.n. (SP); Itapetininga, 28 Nov. 1943, Lima s.n. (RB); Itapetininga, 22 Sept. 1887, Lofgren s.n. (SP) and San Jose dos Campos, 8 Sept. 1909, 339 (RB); Taubate a Sao Luiz do Parahytinga, Sept. 1892, Lofgren y Edwall s.n. (SP); Ypiranga, Nov. 1913, Luederwaldt s.n. (SP); 20 Jun. 1875, Mosen 3835 (S); Helvetia, 6 Dic. 1941, Pickel 5547 (US); Sellow 3228 (R); Campinas, 8 Sept. 1873, Severin 72 (S, UPS) and 12 Sept. 1873, 60 (UPS); Campo Limpo, 13 Sept. 1934, Smith 2 (SP); Oct. 1912, Tamandare 125 (RB); Capital, Avenida Paulista, 18 Nov. 1906, Usteri s.n. (SP); Jan.-Febr., Vecchi s.n. (R); Loreto, 1909, Vecchi s.n. (SP); Campinas, Joaquim Egidio, 27 Aug. 1939, Viegas s.n. (SP); PARANA: Ponta Grossa, 12 Dec. 1903, Dusen 3421 (R, S); Ponta Grossa, 18 Marzo 1904, s.n. (S) and Ponta Grossa y Acuariahyua, 26 Sept. 1911, Dusen 13059 (S); Palmyra, 2 Nov. 1931, Gunzel s.n. (RB) and entre Cantagallo y Palmyra, 12 Nov. 1931, s.n. (RB); Ponta Grossa, 2 Nov. 1928, Hoehne s.n. (SP) and Boa Esperanca, 8 Nov. 1928, s.n. (SP); Ventania, Aug. 1916, Lutzelburg 6795 (NY); RIO GRANDE DO SUL: Andrelandia: Capoeira: Faria, 23 Aug. 1936, Mello 5262 (F, R) and Santa Luzia: Capeira: Baccaria, 19 Sept. 1937, 9206 (F); Santa Marca, 3 Jan. 1902, Malme 928 (S) and 1198 (S); Pinhal, 6 Mar. 1948, Palacios y Cuezzo 2090 (LIL);

PARAGUAY: rio Alto Parana, 1909-1910, Fiebrig 5666 (L, LP, US); GUIARA: Villarica, Jan.1905, Hassler 8729 (G); Canon Villa Rica, 10 Oct. 1928, Jorgensen 3428 (BAB, BABosq, LIL, LP, NY, US) and Sept.1931, 3428 (F, S); PARAGUARI: Carapegua, Sept. 1941, Rojas 9151 (LIL); SAN PEDRO: Sierra de Maracayu, San Estanislao, Hassler 4192 (G,OC); YHU: Nov. 1874, Balansa 2525 (G,S);

URUGUAY: 1894, Arechavaleta 109 (G) and 191 (G); CERRO LARGO: Rio Negro y A. Pallegros, Enero 1936, Rosengurtt a796 (US); DURAZNO: rincon de Cabrera sobre el rio Negro, Dec. 1934, Legrand 322 (F); FLORIDA: Rio Yi: cerca del Arroyo Timote, 2 Nov. 1946, Castellanos 15882 (LIL); Rincon de Santa Elena, 21 April 1943, Callinal, Aragone, Bergalli, Campal & Rosengurtt PL-5173 (LIL); PAYSANDU, Chapicuy, Orillas del Rio Uruguay, 11 Nov. 1942, Rosengurtt B-4178 (LIL) and B-4178E (LIL); RIVERA: Galgo, 240-300 m.alt., 2-4 Dec. 1933, Herter 977a (F, G, U, RB, NC US); TACUAREMBO: Oct. 1895, Arechavaleta 279 (G); Valle Eden, 19 Febr. 1927, Castellanos 15876 (LIL);

ARGENTINA: MISIONES: CAINGUAS: Puerto Rico, 12 Sept. 1947, Schwindt 419 (LIL) and Salto Encantado, 230 m. alt., 1 Jul. 1950, 4652 (LIL); CANDELARIA: Santa Ana, 8 Sept. 1912, Rodriguez 556 (Fac CBA).

2a. Lithraea molleoides var. Lorentziana Hieron. ex. Lillo, Contr. Conoc. Arb. Arg. 2 1910. Arbor 5 m. alta; foliis-5 foliolatis, angusto-lanceolatis, acuminatis; drupis 4.5-5.5 mm. in diametro.

Lithraea Lorentziana Hieron. ex Niederl., Bot. Mens. Mus. Prod. Arg. 3 31 :292. 1892; ex Niederl., Result. Bot. 24. 1890.

Lithraea chichita Speg. in Speg. & Girola, Cat. Descr. Maderas 395. 1910.

Lithraea molleoides Engl. ex Cabrera, Rev. Museo de La Plata n.s. 2:38, 1933, pr. p.

Tree to 5 meters with slender glabrous branches gray to tarnish-gray; the leaves alternate, glabrous, 5-foliolate or partly 3-foliolate (very rarely with a simple leaf); leaflets about equal, 4-7 cm. long, 6-10 mm. broad, linear-lanceolate, acute to acuminate at the apex, narrowly cuneate at the base, sessile, margin entire or slightly irregular; panicles lateral and axillary, clustered near the apices of the branches, erect, the branches very sparsely and shortly pilose; bracts caducous, deltoid, glabrous except ciliate on the margins, .5 mm. broad, .7 mm. long, usually associated with two caducous bracteoles .2X .3 mm.; pedicels about 1 mm. long in flower, increasing to 2 mm. in fruit, sparsely pilose below, enlarged and glabrous above; calyx lobes deltoid-semicircular, glabrous, .8 mm. wide, .5 mm. long; stamens usually 10, in the staminate flowers anthers oblong, 1 mm. long, filaments .5 mm. long, in the pistillate flowers anthers much smaller; disk about 1 mm. broad, lobes as many as the stamens; stigmas 3, style 1, ovary one-celled and one seeded, in the pistillate flowers about 1 mm. broad, much smaller in staminate flowers; fruit 5 mm. long, 5 mm. broad, 4 mm. thick, with smooth creamish or greenish-white epicarp which readily separates from the resinous mesocarp, the mesocarp adhering to the endocarp; seed tan, smooth 4 mm. long, 4 mm. broad, 2 mm. thick.

TYPE: Niederlein 1590, Esteros y Paso de Ibera, 7 October 1886, in the Herbarium of the National Museum in Buenos Aires.

Common names: "Chichita","Chicha", "Aruera", "Arbol malo", "Molle Guazu", "Molle Gris", "Molle", "Corazon de bugre."

The species ranges from southern Brazil, through Uruguay and Paraguay, to northeastern Argentina.

Specimens examined:- BRAZIL: RIO GRANDE DO SUL: Quarai, estancia do Jarau, 26 Dec. 1944, Rambo 26310 (LIL), and 14 Jan.1945, 26310 (LIL);

PARAGUAY: in valle fluminis Y-aca: Valenzuela, Jan. 1900, Hassler 6945 (G); Alto Parana, Fiebrig 6666 (LIL); ENCARNACION: Alto Parana, Jan. 1943, Jimenez 100 (LIL); Sept.1915, Hassler 1368 (G); Jan. 1944, Rojas 10851 (LIL); 23 Jan. 1907, Spegazzini s.n. (BAB); GUAIRA: Villa Rica, 10 Sept.1929, Hassler 3428 (C); Villarica, Nov. 1941, Rojas 3437 (LP) and Sept. 1941, 9151 (LP); YHU: Cosme, entre Villa Rica y Caaguazu, Nov. 1874, Balansa 2325 (BAF);

URUGUAY: ARTIGAS: Santa Rosa Guareim, Nov. 1927, Herter 977, (F, G, LIL, NY, S, U); CERRO LARGO: Rio Negro, Palleros, Jan. 1936, Gallinal, Aragone, Bergalli, Campal & Rosengurtt A-796 (LIL); Sierra Acegna, Jan. 1926, Herter 18444 (MVM, S); Rio Negro, y A° Palleros, 7 Jan. 1936, Rosengurtt 1126 (LP); LAVALLEJA: Minas, Argua, Mar. 1920, Schroeder 15198 (MVM); PAYSANDU: Chapicuy, A° Guariyu, Kilda, Rosengurtt B-4919 (LIL);

ARGENTINA: MISIONES: Denis s.n. (LIL); 1913, Rodriguez s.n. (SI) and Itaimbe, 21 Aug. 1934, Rodriguez 296 (BA, BAB); Spegazzini 1348 (LP); APOSTOLES: San Jose de Pindapoy, 16 Jan. 1942, Bridarolli 2629 (LP), San Jose, 27 Dec. 1944, Sesmero 237 (LIL), Azara, 14 Jan. 1945, 291 (LIL) and 31 Jan.1945, 346 (LIL); CAINGUAS: Puesto Mineral, 250 m. alt., 23 Aug. 1950, Schwarz 10654 (LIL); Puerto Rico, 5 Mar. 1948, Schwindt 641 (LIL); CANDELARIA: Loreto, 8 Dec. 1947, Cosso 124M (BA); entre Garupa y Candelaria, 9 Oct. 1943, Gavio s.n. (BA); Sept. 1939, Goytia s.n. (BAB); Estacion Experimental de Loreto, 9 Mar. 1930, Gruner 85 (LIL); Bonpland, Nov. 1910, Jorgensen 155 (BAB); Santa Ana, 2 Dec. 1904, 723 (BAB) and Santa Ana, 2 Dec. 1904, 803 (BAB, G); Loreto, 220 m., Montes 53999 (BA), Yabebyri, 20 April 1945, 796, (BAB, LIL), Loreto, 218 m., 14 Jul. 1945, 1000 (LIL), Santa Ana, 216 m., 6 Nov. 1945, 1261 (LIL), La Pastora, 220 m., 6 Jun. 1946, 2327 (LIL, U), Loreto, 220 m., 9 Oct. 1946, 8 (BAB), Loreto, 220 m., 1 Dec. 1946, 83 (BAB) and Loreto, 31 Mar. 1947, Montes s.n. (BA); Loreto, Jul.1942, Perez s.n. (BA); Santa Ana, 8 Sept. 1912, Rodriguez 556 (LIL, NY, SI), and Santa Ana, 23 Dec. 1912, 12574 (LIL); Santa Ana, 4 Feb. 1907, Spegazzini s.n. (BAB, LP), Santa Ana, 21 Jun.1909, Venturi 96 (LIL); CAPITAL: Posadas, Zarman, 27 Aug.1945, Bertoni 1826 (LIL); Posadas, La Granja, 5 Dec. 1907, Ekman 1957 (S); Posadas, Oct.1900, Gallardo 3739 (BA); Posadas, 16 Febr.1944, Meyer 5427 (LIL) and Arroyo Vera, 24 Jan. 1947, Meyer 11400 (LIL); Posadas, Jan. 1907, Spegazzini 1349 (LP); CONCEPCION: Concepcion, 1 Febr. 1948, Schulz 6916 (LIL); IGUAZU: Salto Iguazu, April 1913,

Rodriguez 12500 (LIL); El Dorado, 160 m., 26 Sept.1949, Schwindt 2117 (LIL); SAN IGNACIO: Ihaca-guazu, 11 Sept. 1945, Bertoni 1876 (C, LIL); 17 Febr. 1945, Descole 3275 (LIL); San Ignacio, 20 Nov. 1922, Devoto 156 (BAB) and 156B (BAB); San Ignacio, 27 Jan. 1947, Meyer 11604 (LIL, U); Teyuanare, 222 m., 5 April 1946, Montes 2107 (LIL), San Ignacio, 4 Febr.1947, sn. (BA) and 8 Febr. 1947, s.n. (BA); 15 Sept. 1913, Quiroga s.n. (BA); camino a la Plantadora, Jul. 1927, Scala s. n. (LP); Gobernador Roca, 8 Sept. 1945, Schwarz 1229 (LIL, U), Balsa Nancanguazu, 31 Aug. 1945, 1188 (LIL), Gisela, 14 Sept. 1946, 3374 (LIL), Santo Pipo, 3 Oct. 1947, 4873 (LIL), Nancanguazu, 22 Oct. 1947, 4994 (LIL, U), Gobernador Roca, 13 Nov. 1947, 5158 (LIL), Santo Pipo, 27 Sept.1948, 6175 (LIL) and Santo Pipo, 4 Oct. 1948, Schwarz 6281 (LIL); SAN JAVIER: Concepcion de la Sierra, 1 Febr.1945, Sesmero 360 (LIL); SAN PEDRO: San Pedro, 4 Nov. 1886, Niederlein 713 (SI); El Alcazar, 1 April 1949, Schwindt 1449 (LIL); Campo Cumprido, 22 Sept. 1945, Bertoni 2102 (LIL); CORRIENTES: Esteros y Paso de Ibera, 7 Oct. 1886, Niederlein 1590 (BA, SI) and Esteros y Paso de Ibera, 7 Oct. 1886, 719 (BA); BERN ASTRADA: Dern de Astrada, 20 Oct. 1949, Schwarz 8358 (LIL) and 8361 (LIL); CONCEPCION: Loma Alta, 17 May 1944, Ibarrola 540 (LIL) and 29 Aug. 1945, Ibarrola 3191 (F, LIL, S); ESQUINA: Barranca rio Parana: Puerto Mercedes, 24 Jul. 1922, M. H. 84 (BAB); Rio Parana: Puerto Mercedes, 24 Aug. 1922, Rojas 4337 (BAF); GENERAL PAZ: Lomas Vallejos, 11 Oct. 1945, Ibarrola 3499 (LIL) and Lomas Vallejos, Rincon de Vences, 21 Oct.1945, 3578 (LIL); MBURUCUYA: Mburucuya, 22 Sept. 1944, Hunziker s.n. (CORD); Estancia Santa Teresa, 15 Nov. 1947, Pederson 56 (C); Estancia Santa Teresa, 400 m. alt., 14 Nov. 1949, Schwarz 8707 (LIL); SAN LUIS: San Luis Palmar, Cerrudo Gue, 5 Oct.1945, Ibarrola 3434 (F, LIL, S), SAN MARTIN: Tres Cerros, 8 Nov. 1936, Burkart s.n. (LP), 7976 (SI) and 8094 (SI); Yapeyu, 2 Jan.1945, Ibarrola 1928 (LIL); SAN MIGUEL: Loreto, 8 Sept. 1944, Ibarrola 818 (LIL); SANTO TOME: Santo Tome, 26 Nov. 1947, Cozzo 27M (BA); 9 Febr. 1910, Venturi 444 (LIL); Santo Tome, 25 Nov.1944, Ibarrola 1421 (LIL); ITATI: Itati, 20 Jul. 1930, Fonseca s.n. (BA); ENTRE RIOS: URUGUAY: Salto Grande, 5 Febr. 1931, Castellanos s.n. (BA); Concepcion del Uruguay, Dec. 1917, Hauman s.n. (BA, LP); Concepcion del Uruguay, Oct.1877, Lorentz (UPS) and Oct. 1878, s.n. (CORD), 1665 (BAF, CORD, K), and 1665E (L); CHACO: RESISTENCIA: Fontana, Nov.1935, Meyer 2014 (LIL); Colonia Benitez, Jan. 1928, Schulz 34 (BAB) and Fontana, May 1928, Schulz 843 (LP).

3. Lithraea ternifolia (Gillies) Berkley, Rom. n. comb.
Schinus ternifolia Gillies ex Hook.& Arn., Bot. Misc. 3: 177. 1833
Schinus tenuifolius Steud., Nom. ed. 2. 2: 530.1841.
Lithraea Gilliesii Griseb., Goett. Abh. 19: 114. 1874.

Schinus Terebinthifolius var. ternifolius March., Rev. Anac. 166. 1869.

Tree to seven meters, branches tannish gray, at first minutely and sparsely puberulent but soon glabrate; leaves compound (or rarely the first leaf on a branch simple), glabrous, alternate; leaflets 3-5, thinly coriaceous, ovate-lanceolate, acuminate or rarely abruptly obtuse, the base cuneate, sessile, the margins entire or slightly irregular, the lateral one inequalateral, the terminal equalateral, mostly 5-8 cm. long, 8-25 mm. broad, rachis narrowly winged, 1.5-2.5 cm.long, petiole not winged, 2.5-4.5 cm.long; inflorescences lateral and subterminal panicles more or less clustered at the ends of branches, erect in flower, more or less lax in fruit, 3.5-5.5 cm. long, at first very sparsely puberulent (or glabrous) and soon glabrate; bracts .4 mm. broad (usually associated with 2 similar but smaller bracteoles), glabrous except with a few sessile glandular cilia on the margins, deltoid; pedicels about 1 mm. long or in fruit to 4 mm. long, at first sparsely pilose but becoming glabrate; the calyx with 4 to 5 glabrous lobes 1 mm. broad and .5 mm. long, with margins bearing a few sessile and glandular trichomes; petals 4-5, lanceolate, 1 mm. broad, 2.5 mm. long; in the staminate flowers the 8 to 10 stamens with filaments .6 mm. long, anthers oblong, 1 mm.long, while in the pistillate flowers they are less than half as large with the anthers sterile; the disk about 1 mm. broad, lobes as many as the stamens; the pistil of the staminate flowers with pistil .5 mm. long, .25 mm. broad, but in the pistillate flowers the ovary 1 mm. broad and the 3 stigmas hemispherical; fruit 6 mm. long, 8 mm. broad, and 4-5 mm. thick, glabrous, stigmas persistent, brownish, epicarp creamish-yellow or greenish-white, readily separating from the thin black resinous mesocarp; seed faintly rugose, 5 mm. long, 6 mm. broad, 2.8 mm. thick.

TYPE: There probably exists in the Kew Herbarium a specimen, but this has not been seen by the present writer, nor any direct citations of it.

Common names: "Molle de beber", "Molle blanco", "Molle dulce", "Molle de Cordoba", "Molle", "Palo Negro", "Molle de bebe."

This species ranges from Central Bolivia to Central Argentina, mostly in the mountains.

Specimens examined:- BOLIVIA: Bridges s.n. (K); COCHABAMBA: Vila-Vila a Mizque, 2400 m., --- 2116 (LP); LA PAZ: Larecaja: San Pedro cerca Sorata, 2650 m., 9 Nov. 1897 & Jan. 1898, Mandon 767 (F, G, NY, S, US); SANTA CRUZ: Vallegrande: Samaipata, 1200 m., 13 Mar. 1920, Steinbach 3725 (LIL, NY, US) and Bergwald, 1600m., 13 Oct. 1928, 8225 (BA, LIL, NY, S); TARIJA: Cuesta de Tambo, entre el Tambo y Narvaes, 2 May 1873, Lorentz & Hieronymus s.n. (CORD);

ARGENTINA: 1873, Lorentz & Hieronymus s.n. (NY); JUJUY: Ledesma: Sierra de Calilegua,750 m., 7 Oct. 1927, Venturi 5371 (F, LIL, S. SI, US); SALTA: CANDELARIA: Quebrada de Un-

quillo, 1200 m., 7 Nov.1931, Schreiter 6644 (LIL, NY) and 6647 (LIL, NY); CHICOANA: San Pedro de Escoipe, 29 Aug. 1949, Hueck 231 (LIL); CORONEL MOLDES: La Hoyada, 14 Nov. 1942, Burkart 13148 (SI); GUACHIPAS: Quebrada d el rio Alemania, "bosques xerofilos", 12 Aug. 1936, Cabrera 3754 (LP, NY, SP); Pampa Grande, Nov. 1912, Jorgensen 13193 (LIL); Pampa Grande, Jan. 1897, Spegazzini 1341 (LP); La Vina: Jan. 1897, Spegazzini 1341 (LP); La Vina: Jan. 1897, Spegazzini 1342 (LP); TUCUMAN: Cerro del Periquillo, 1100 m., 26 Nov. 1888, Lillo 1015 (LIL) and Cuesta de las Juntas, 1500 m., 23 Dec. 1888, 1383 (LIL); BURRUYACU: Cerro del Campo, 1200 m., Mar. 1918, Bailetti 915 (LIL); Rio del Nio, 10 Febr. 1914, Monetti 1961 (LIL); Cerro del Campo, 1000 m., 14 Sept.1928, Venturi 7315 (BAB, F, US); CAPITAL: Alto de la Polvora, 500 m., 7 Oct. 1924, Venturi 3322A (BAB, LIL, LP, S); CHICLIGASTA: Alpachirin, 600 m., 7 Mar. 1924, Venturi 3322 (LIL, US); Rio Cochuna, 10 Nov. 1945, Villa 645 (LIL); TAFI: Cabroharco, 12 Nov. 1944, Olea 1 (LIL); TRANCAS: Planchones, 1300 m., 13 Jan. 1899, Lillo 1876 (LIL); Lomas de Raco, 24 Sept. 1920, Schreiter 92 (LIL) and 1431 (LIL); CATAMARCA: Jun. 1942, Schaefer s.n. (BAB); Febr. 1897, Spegazzini 1340 (LP); Ambato: Camino al Rodeo, 1300 m., Febr. 1941, Parodi 14009 (LP); ANCASTI: "del fruto se prepara una bebida permanente llamada "aloja"", Jan. 1915, Santillan s.n. (LP); Huillapinna, desde Concepcion hasta Pampichuela, Nov. 1909, Spegazzini s.n. (BAB); ANDALGALA: 21 Sept. 1945, Castellanos s.n. (BAFacS); Andalgala, 10 Oct. 1915, Jorgensen 989 (BA, LIL, SI, US) and Dec. 1914, 989 (BA); Fuerte de Andalgala, Oct. 1872, Schickendantz s.n. (G) and en los bordes del Rio Andalgala, Oct. 1872, II (CORD); Agua de la Chica, 1500 m., 3 Nov. 1930, Schreiter 6419 (LIL); CAPITAL: Quebrada del Tala, 20 April 1908, Castillon 165 (1339) (LIL) and 21 Jun. 1908, 291 (LIL); 11 Sept. 1910, 35 (SI) and Choya, 27 Sept. 1910, s.n. (BAB); La Brea, 25 Jan.1947, Luna 1034 (LIL); COPALLAN: Miraflores, Las Rejas, 6 Jan.1947, Luna 399 (LIL); PIEDRA BLANCA: de la Cuchilla del Cura, Jan. - Febr.1910, Spegazzini s.n. (BAB); EL ALTO: El Alto, 7 Nov. 1948, Arganaraz 720 (LIL); Sierra de Gracian, 15 Jan.1940, Castellanos s.n. (BA); LA RIOJA: Quebrada de Talampaya, 28 Jan. 1906, Kurtz 13310 (CORD); CAPITAL: Puerta de la Quebrada al K 9-10, 450 m., 10 Oct. 1941, Alaniz 30 (LIL, LP, U); GENERAL BELGRANO: Sierra de Olta, Agua del Medio, 3 Febr. 1940, Castellanos s.n. (BA) and 8 Febr. 1940, s.n. (BA, LIL); GENERAL ROCA: Chepes, 10 Nov. 1945, Cuezzo 1004 (LIL); GOBERNADOR GORDILLO: Retamo, 220 m., 17 Mar. 1933, Hayward 20 (BAB); SANAGASTA: Sierra Velasco; Yacuchi, Cuesta de la Casa de Piedra, 2100 m., 28 Febr. 1908, Kurtz 15472 (CORD); SAN LUIS: Comechingones, Castellanos s.n. (BA); Alto de las Jarillas, 7 Mar. 1882, Galander s.n. (CORD, G, OC); Bajo de Velis, 19 Jan. - 19 Febr. 1895, Kurtz s.n. (LP) and 8532 (CORD) and 8578 (CORD); quebrada de los Cordones, 4 Sept. 1948, Ruiz 11638 (LIL); AYACUCHO: 24 Nov. 1926, Castellanos s.n. (BA);

BELGRANO: Caleras del Gigante, 14 Nov. 1926, Castellanos s.n. (BA); Nogoli, 1922, Gez 70, (SI); CAPITAL: Sierra Varela, 22 Dec. 1925, Castellanos s.n. (BA); JUNIN: Piedra Blanca, 2 Febr. 1942, Digilio s.n. (LIL); Merlo, Nov. 1910, Gerth s.n. (L); Rincon del Este, 950 m., 10 Febr. 1948, Meyer 13793 (LIL) and 12 Febr.1948, 13857 (LIL); Piedra Blanca, 11 Oct. 1942, Russo 21 (LIL); PEDERNERA: El Portejuelo, Jan.1933, Vignati 382 (LP); PINGLES: Cerro en la Aguada, 5 Nov. 1940, Burkart 10950 (LIL); Quebrada de los Carrizales, 12 Febr. 1925, Castellanos s.n. (BA); Cerro de la Aguada, 5 Nov. 1940, Covas 1095 (LP, NY); CORDOBA: 1918, Bruch s.n. (BA) and 30 (LP); Castellanos 711 (F, SI); Lopez 36 (LP); Lorentz s.n. (SI); 25 Mar., Lossen 453 (F, SI); ASCOCHINGA: Cordon Oriental, 17 Aug. 1926, Millan s.n. (BA); CALAMUCHITA: Sierra Chica, Arroyo Cachicural, 1000-1800 m., Mar. 1894, Bobenbender s.n. (NY, R) and 8206 (CORD); Sierra Chica, Los Cocos, Mar. 1940, Cabrera 6388 (F, NY); Sierra Chica, Estancia La Reduccion, 600 m., 28 Dec. 1935, Burkart 7303 (F, SI); Capilla a Los Cocos, Nov. 1915, Hauman s.n. (BA); Sierra Chica, entre Dique y Casabamba, Sept. 1904, Holmberg s.n. (SI); Sierra Chica, La Falda, 1000 m.alt. 8 May 1917, Osten 10445 (LP); Sierra Chica, Nov. 1888, Spegazzini 1497 (LP); Sierra Chica de Cordoba, 3 Oct. 1904, Stuckert 14399 (CORD); CAPITAL: Altos Sud de Cordoba, 17 Febr. 1897, Stuckert 1809; alrededores de Cordoba, Nov. 1902-Febr. 1903, Spegazzini 1495 (LP); COLON: Sierra de Cordoba, Carlos Paz, 14 Febr. 1939, Bridarolli 593 (LP); Unquillo, 1926, Bruch s.n. (LP, S); Unquillo, Oct. 1939, Gonzalez Bonorino s.n. (FACCBA); Unquillo, Villa Diaz, 1 Nov. 1947, Cristiani 374 (BA); camino El Cuadrado, Mar. 1938, Dawson 255 (LP); Rio Ceballos, Oct. 1875, Hieronymus 240 (F, CORD); cerca de rio Ceballos, 11 Nov. 1886, Kurtz 4395 (CORD); Rio Ceballos, Jun. 1939, Lahitte s.n. (BAB); Sierra de Cordoba, Oct. 1872, Lorentz 381 (CORD); Salsipuedes, 26 Mar. 1944, O'Donell & Rodriguez 691 (LIL); Unquillo, Cabana, 5 Febr. 1950, Scolnik, Araque & Barkley 20Cb011 (LIL); Sierra de Saldan, 8 Jun. 1897, Stuckert 3123 (CORD, LIL); Casa Bamba, 23 April 1899, Stuckert 6805 (CORD); ISCHILIN: 17 Sept. 1945, Hunziker 6100 (CORD, US); Las Penas, Feb. 1871, Lorentz 381 (CORD, G); Quilino a San Jose, 390 m., 17 Dec. 1947, Meyer 13471 (LIL); MINAS: Potrero de Marquez, 900 m., Mar. 1896, Stuckert 2510 (CORD, LIL) and 13 Nov. 1896, s.n. (CORD); PUNILLA: Capilla del Monte, Nov. 1895, Bodenbender s.n. (BAF); Capilla del Monte, La Toma, 15 Jun. 1945, Castiglioni 1908 (BABosq); Capilla del Monte, Febr. 1909, Guyssegur s. n. (SI); La Canada, en las pendientes inferiores del Pan de Azucar cerca de Rio Zeballos, 20-23 Dec. 1875, Hieronymus 76 (CORD); Los Cocos, Cerro Caravuelta, Valle de Punilla, 14 Sept. 1917, Hosseus 941 (CORD): Cuesta de Cosquin, 23 Jan. 1885. Kurtz 2 (CORD), Pan de Azucar, 1 Febr. 1885, 319 (CORD) and Quebrada del Pantano cerca Capilla del Monte, 20 Dec. 1889, 6643 (CORD, LP, NY); Dique San Roque, Sierra Chica, 14 Aug. 1908, Kurtz & Glaser 15718 (CORD); Cosquin, Pan de Azucar, 1000 m. Jan.-Feb. 1936,

Rodrigo 550 (LP, N Y, S); vicinity of Cosquin, 10 Sept. 1915, Rose 21081 (NY, US); La Cumbre, 25 Jan. 1948, de la Sota 466 (LIL), La Falda, 27 Jan. 1948, 485 (LIL) and Parque Los Cocos, 14 Febr. 1948, de la Sota 720 (LIL, U); Huerta Grande, 20 Febr. 1897, Stuckert 2108 (CORD), Ochoa, 17 Nov. 1902, 12055 (CORD, G, LIL), Ochoa, Sierras Chicas, Dec. 1900, 9987 (CORD, LIL), Ochoa, 3 Oct. 1904, 14399 (G, LIL), Los Cocos, April 1909, 20244 (CORD), and Huerta Grande, 10 May 1910, Stuckert 21548 (CORD); San Sebastian, 22 Jan. 1947, Villafane 449 (C, LIL); SAN ALBERTO: Cordon Central, Pampa de Achala, 9 Febr. 1922, Castellanos s.n. (BA) ; Mina Clavero, 25 Jan.1935, Clos 5735 (BAB); Vista Alegre, 3 Febr.1948, Meyer 13296 (LIL); Mina Clavero, 1000 m., 16 Dec. 1901, Stuckert 10603 (CORD, G); cerca Mina Clavero, 1000 m., 18 Jan. 1950, Vervoorst 641 (LIL); SAN JAVIER: San Javier, 700-1200 m., 30 Dec. 1926, --17 (LP); 20 Oct. 1927, Castellano s.n. (BA); Dique de la Vina, 30 Jan. 1948, Meyer 13352 (LIL); SANTA MARIA: entre Potrero de Garay y Los Molinos, 2 Nov. 1949, Krapovickas 6509 (LIL); Cerro La Cocha, 2000 m., 20 April 1946, Pierotti 5059 (LIL); SOBREMONTE: Potrerillos, Jun. 1938, Devoto 379 (BABosq); TOTORAL: Ascochinga, 20 Oct. 1936, Giardelli 482 (SI); TULUMBA: Cerro Colorado, 16 Oct. 1949, Hunziker 7788 (CORD); Cerro Colorado, 25 Aug. 1939, Maldonado 120 (BOG, LP, NY).

4. Lithraea caustica (Molina) Hooker & Arnott Bot. Misc. 3: 175. 1833; Engler in Martius & Eichler, Flora Brasil. 12^2: 396. 1876; Engler in De Candolle, Monogr. Phaner. 4: 348. 1883; Reiche, Anal. Univ. Chile 47: 62. 1897; Reiche, Flora de Chile 2: 26. 1898: Cabrera, Rev. Museo de La Plata n.s. 2: 36. 1938.

Laurus Caustica Molina, Saggio Sulla Storia Naturale del Chile ..... 176. 1782.

Persea caustica Spreng., Syst. Veget. 2: 269. 1825.

Lithraea venenosa Miers, Trav. Chil. 2: 529. 1826.

Rhus caustica Hook. & Arnott, Bot. of Capt. Beech Voy. 15, t. 1830.

Duvaua pleuropogon Turcz, Bull. Soc. Nat. Mosc. I, 31: 467. 1858, pr.p.

Schinus Lithi Domb. ex March., Rev. Anac. 183. 1869, in syn.

Mauria simplicifolia Humb. & Kunth. ex Hook. & Arn., Bot. Misc. 3: 175. in syn.; Engl. in Mart. & Eichl., Fl. Brasil 12^2: 396. 1876, in syn.

Shrub or small tree to four meters tall, evergreen; branches (mostly growing in length in February) greenish-tan and moderately thick, later becoming tan and then dark gray-brown, glabrous; leaves simple, lamina thickly coriaceous, glabrous, broadly lanceolate to ovate or rotund, obtusely acute, obtuse or emarginate at apex, cuneate to truncate at base, usually 21 x 55 mm. to 33 x 45 mm. but rarely from 16 x 25 mm. to 75 x 110

mm., veins white and prominent, margin thick and white, entire to irregular and subrenate, petiole 3 to 15 mm. long, thick, often winged almost to base by the decurrent lamina, glabrous; panicles axillary, 1 to 5 cm. long, very sparsely pilose at the base of the inflorescence; flowers yellow; bracts lanceolate-deltoid, brownish, about 1 mm. long, persistent; pedicels in flower 1 mm. long, in fruit 2 mm.long, very sparsely pilose; masculine flowers with calyx brownish-yellow, glabrous, lobes five, about two times as long as broad, petals 5, yellow, lanceolate, glabrous, obtuse and slightly inrolled at apex, 3 mm. long, 1 mm. wide, stamens 10, anthers 1.6 mm. long, filaments 1.5 mm. long, enlarged twoard the base; disk cream-colored, 10 lobed, 1 mm. in diameter; pistil 1 mm. long, three stigmas and styles and a flaccid ovary; feminine flowers with calyx yellowish, glabrous, lobes about as long as broad, persistent, petals 5, yellowish, broadly lanceolate, obtuse and enrolled at apex, 2 mm. long, 1 mm. wide, tardily deciduous, stamens 10, anthers 5 mm. long, filaments 6 mm.long, slender, disk cream-colored, 10 lobed, 1 mm. in diameter, pistil 2 mm. long, 3 hemispherical stigmas, style 1.5 mm. long, ovary spherical 1.3 mm. in diameter; fruit 12 mm. long, 11 mm. wide, 3.5 mm. thick, the stigma and style brownish-black, persistent, epicarp cream-yellow, readily separating from the black thin resinous mesocarp, seed tan-brown, very slightly rugose, 4.5 mm. high, 5.5 mm. wide and 2.5 mm. thick.

Typical specimen: Kausel 874 from las planicies del Rio Claro, Curico, Chile, 18 January 1941.

Common names: "Litre", "Lithi", "Llithi".

The species is limited in distribution to central Chile.

Specimens examined:- CHILE: Beechey s.n. (G); La Leona, 1828, Bertero 413 pr.p. (G); Dombey s.n. (LISU); "Perou", Dombey 884 (G, L) and 885 (L, NY); 31 Oct.1896, Dusen s.n. (S); Gay s.n. (G); Compania, Nov.1853, Germain s.n. (SGO); Pavon 994 (G); Chile austral, Poeppig s.n. (L); Constitucion, Sept. 1907, Reiche s.n. (SGO); COQUIMBO: Illapel, Pichidangui, 5 m. alt., 15 Oct. 1948, Looser 5632 (SGOLooser); OVALIE: Quebrada del Chanar, 12 Nov.1937, Ibarren s.n. (SGO); ACONCAGUA: Punta Molles, 15 Oct.1948, "forma rostrera", Kausel 2663 (SGOKausel); Los Molles, Nov.1862, Landbeck s.n. (SGO); Punta Molles, 50 m. alt., 15 Oct. 1948, Looser 5631 (SGOLooser); VALPARAISO: 8 Oct. 1895, Buchtien s.n. (US); 1832, Gaudichaud 111 (G); 1825, Macrae s.n. (G); SANTIAGO: Maypu, Bertero s.n. (L); 5 Nov. 1918, Claude-Joseph 643 (US), Jan. 1919, 782 (US) and 839 (US); Quebrada de Pinalolen, 850 m. alt., 11 Mar. 1951, Kausel & Barkley 21CH040 (SGOKausel) and 21Ch041 (SGO Kausel), 1500 m. alt., 21Ch059 (SGOKausel) and 1000 m. alt., Kausel & Barkley 21Ch067 (SGOKausel); 870 m. alt., 20 Nov. 1927, Montes 456 (F); Cerro San Cristobal, 18 Jan.1938, Perez s.n. (BA); Cerro San Cristobal, 1858,Philippi s.n. (SGO) and Chacabuco, April 1879, s.n. (SGO); Apoquindo, 1929, Roszczyn-

ski s.n. (SGOQF); Quebrada Dormida, 8 Mar. 1951, Sudzuki, Sotomeyer & Barkley 21Ch009 (SGo); TALCA: Talca, 16 Dec. 1925, Gunckel 8164 (SGOGunckel); O'HIGGINS: May 1829, Bertero 413 p.pr. (F); Termas de Cauquenes, 750 m. alt., 11-15 May 1946, Looser 5153 (SGOLooser); Oct. 1890, Philippi 378c (LP); COLCHAGUA: Cauquenes, 3000-5000 m. alt., 14-17 May 1882, Ball s.n. (NY); Hacienda Los Tralhuenes (Hiuque), 15 Febr. 1946, Kausel 1792 (SGOKausel), Cutemu a Quirahue, 150 m.alt., 17 Febr. 1946, 1852 (SGOKausel), and Hacienda Lolol de Cerro Robles, 200-900 m. alt., 19 Febr.1946, Kausel 1895 (SGO Kausel); Banos de Cauquenes, Barrancas del rio Cachapoal, 26 Jan. 1938, Perez s.n. (BA); CURICO: Los Quenes, Planicies del rio Claro, 18 Jan.1941, Kausel 874 (LIL) and 875 (LIL); Llico, Dec. 1861, Miers s.n. (LP); LINARES: Cordillera de la Compania, 1888, Philippi s.n. (US); Quimamavida, Nov. 1926, Gunther s.n. (S); CONCEPCION: Talcahuano, 6 Sept. 1896, Dusen s.n. (G); Cerra Caracol, 15 Nov. 1923, Gunckel 29 (SGOGunckel), Isla, Quriguina, 23 Nov. 1924, 398 (SGOGunckel) and Parque Pedro del Rio, Gualpen, 150 m.alt., 1 Jan.1941, Gunckel 9915 (LP, SGOGunckel); Chiguayante, 21 Nov. 1934, Junge 1103 (SGO Gunckel) and Hualqui, 15 Nov. 1937, 2100 (SGOGunckel); Laraqueti, Febr. 1938, Kausel 375 (LIL) and 375A (LIL), Villamavida, 12-25 Febr. 1945, 1578 (LIL) and 1580 (LIL), and Laraqueti, 14-27 Febr.1949, Kausel 2800A (LIL, SGOKausel); Cerro Caracol, 7 April 1924, Looser 5649 (SGOLooser); Concepcion, Mertens s.n. (NY); Fondo Boldol Librenal, 21 Nov. 1932, Olate 2530 (BOG, RB); San Vicente, Oct.1890, Philippi 378a (SGO); hills back of Jalcahuano, 22 Nov. 1916, Skottsberg & Skottsberg s.n. (S) and 1366 (F, NY); CAUTIN: Almagro, 50 m. alt., 21 Febr. 1943, Gunckel 14181 (SGOGunckel); MALLECO: Cordillera, Nahuelbuta,8 Dec. 1943, Lavin s.n. (SGOGunckel); Angel, 10 Febr.1892, Kuntze s.n. (NY, US).

4a. Lithraea caustica var. pilosa Engl. in Martius & Eichler, Flora Brasil 12²: 396. 1876.

Lithraea caustica f. pilosa (Engl.) Cabr., Rev. Museo de La Plata n.s. 2: 38. 1938.

Tree with moderately slender rigid branches, branches ten and densely pilose at first, later becoming tannish-gray and eventually glabrate; leaves simple, oblong-obovate, 4-7 cm. long, 1.5-3.5 cm. broad, coriaceous, margin somewhat waxy but rarely plicatulate, subentire, white corneous, the veins whitish, the veins above, and the under surface, soft pilose at least at first, eventually becoming glabrate, apex truncate or emarginate, base broadly cuneate and slightly decurrent on the 5-7 mm. long, pilose petiole; inflorescences terminal and subterminal contracted panicles; axis of the panicle long pilose; bracts lanceolate-deltoid, pilose, 1.2 mm. long, .7 mm. broad, usually having two bracteoles associated, these less than half as large; pedicels in flower 1 mm. long, in fruit 2 mm. long,

sparsely long pilose; calyx very sparsely long pilose, the 5 lobes bluntly deltoid, .8 mm. broad, .6 mm. long, margin ciliate with long simple hairs; petals ovate-acute, 2 mm. long, 1.4 mm. broad, glabrous except for a pilosity of three or four hairs near the center outside; stamens in the staminate flowers with anthers 1 mm. long, oblong, the filaments about .7 mm. long or the alternate ones slightly shorter, in the pistillate flowers stamens less than half as large and the anthers sterile; disk about 1.1 mm. broad, lobes as many as the stamens; pistil in the pistillate flowers with three hemispherical stigmas, one style, and ovary hemispherical about 1 mm. in diameter, in the staminate flowers the pistil much smaller and the stigmas with two points; fruit 6 mm. long, 7 mm. wide, 4 mm. thick, the epicarp whitish, separating readily from the resinous dark mesocarp, the mesocarp adhering to the bony endocarp; seed brown, 5.5 mm. high, 6.5 mm.wide, and 3 mm. thick, upper margin slightly rough.

Typical specimen: Werderman 501, from Hacienda Montegrande, Curico, Chile, 800 m., alt., Dec. 1924.

Common name: "Litre".

The variety is limited in distribution to central Chile.

Specimens examined:- CHILE: La Leona, 1828, Bertero 413 p.pr. (G); 1855-1856, Germain s.n. (G); Agua de Piedra, Sept. 1860, Philippi s.n. (SGO) and Iter Tinguiririca, s.n. (SGO); Constitucion, Sept. 1890, Reiche s.n. (SGO); 1884-1885, Statin s.n. (NY); 1838-1842, Wilkes s.n. (NY); OVALLE: Caren, 1889, Geisse s.n. (SGO); ACONCAGUA: Quillota, Aug. 1829, Bertero s.n. (G); Quillota, Germain s.n. (AGO); VALPARAISO: Laguna Verde, 500 m. alt., 14 Nov. 1937, Andreas 81 (U); Bridges s.n. (G); Oct. 1925, Claude-Joseph 3708 (SGOGunckel, US); Oct. 1928, Gunther & Buchtein s.n. (S); Harshberger 1066 (US) and in Chaparral at Las Zorras, 15 Aug. 1927, 3397 (NY); Limache, 22 May 1923, Looser s.n. (SGOLooser) and 18 Sept. 1925, 5658 (SGOLooser), and Cerro Huinca, 11Oct. 1926, Looser 5653 (SGOLooser); 1825, Macrae s.n. (G); Zapallar, 17 Sept. 1908, Skottsberg s.n. (UPS); SANTIAGO: Penalolen, 1000 m. alt., 25 Jun. 1938, Andreas 809 (U); Cerro San Cristobal, 14 May 1882, Ball s.n. (US); Maypu, Febr. 1829, Bertero s.n. (G) and 1835, 413 (NY); Los Condes, 12 Jan. 1936, Cabrera 3480 (LP, NY, S); San Cristobal, Oct. 1928, Franco 1859 (SGOQF); Arquero, Nov. 1830, Gay 1955 (SGO); Tiltil, 700-1000 m. alt., 7 Sept.1941, Gunckel 11431 (SGOGunckel); Estrella, 770 m. alt., 23 Nov. 1900, Hastings 199 (US); 1912, Husbank 728 (US); Casa de Piedra, Penalolen, 1926, Kausel 296 (LIL) and Los Condes, 800 m. alt., 7 Dec. 1947, 2483 (LIL, SGOKausel); Quebrada de Penalolen, 11 Mar. 1951, Kausel & Barkley 21Ch039 (SGOKausel) and 21Ch060 (SGOKausel); Cerro San Cristobal, 22 Jul. 1923, Looser 5660 (SGOLooser) and 9 Dec. 1923, 5659 (SGOLooser), Apoguinto, 29 Mar. 1925, 5661 (SGO Looser), Manzano, 29 Nov. 1925, 5654 (SGOLooser), Sierra San Cristobal, 2 Mar. 1926, 5657 (SGOLooser), San Alfonso, 23 Jun. 1926, 5655 (SGOLooser), Manquehue, 1300 m.alt., 24 Oct. 1926, 5656 (SGOLooser) and Hacienda Chacabuco, 1-3 Nov. 1929, Looser

s.n. (R); Cerro San Cristobal, 18 Jan. 1938, Perez 23202 (LIL); San Cristobal, Dec. 1855, Philippi 378a (LP), San Ramon, 1 Nov. 1879, 378b (SGO), Dec., 548 (G, S), 1861, s.n. (G), 1862, s.n. (G) and Chacabuco, April 1879, Philippi s.n. (LP); Apoquimbo, 29 Sept. 1926, Reyes 1858 (SGOQF); in moist, sandy ground near rio Maipo at El Manzano near San Jose de Maipo, 1000 m.alt., 4 April 1947, Sparre 2381 (LIL); alrededores de Tiltil, 8 Mar. 1951, Sudzuki, Soloman y Barkley 21Ch001 (SGO); Andesmo, 5 Jan. 1947, Wall 37 (S); O'HIGGINS: San Vicente de taguatagua, Palmeria de Cocalon, 24 Oct. 1942, Bartlett, Munoz y Sudzuki 3508 (SGO); La Rosa, Dec. 1827, Poeppig 602 (G); Banos de Cauquenes, 1872, Reed s.n. (SGOGunckel); COLCHAGUA: Sta. Cruz, Huique, 15 Feb. 1946, Kausel 1792 (LIL); CURICO: Iloca, 1923, Thumm s.n. (SGOLooser); Hacienda Montegrande, 800 m. alt., Dec. 1924, Werdermann 501 (F, G, LIL, NY, S, U, US); NUBLE: San Carlos, Rio Nuble, Hacienda Las Mercedes, 7 Mar. 1944, Kausel 1365 (LIL); Rio Claro, Nov. 1924, Muno 1901 (SGOQF); CONCEPCION: Mertens s.n. (G).

The Herbarium
Department of Botany
College of Agriculture
University of Baghdad
Abu Ghraib, IRAQ

Description of plates

PLATE I. Lithraea caustica (Molina) Hooker & Arnott, Claude-Joseph 839, January 1919, from Santiago, Chile, in the United States National Herbarium. Photograph by J. Araque M. X.25

PLATE II. Lithraea brasiliensis March., Dusen 8740, from Parana, Brazil, in the Missouri Botanical Garden Herbarium. Photograph by J. Araque M. X.25

PLATE III. Lithraea ternifolia (Gillies) Barkl., Gillies, San Luis, Argentina, in the Royal Botanic Garden Herbarium, Kew. Photograph by courtesy of the Royal Botanic Garden, Kew.

PLATE IV. Lithraea caustica var. pilosa Engl., Wilkes, 1838-1842, Chile, in the New York Botanical Garden Herbarium. Photograph by the author.

PLATE V. Lithraea molleoides (Vell.) Engl., Widgren 1082, Caldas, Minas Geraes, Brazil, 1845, from the Herbarium of the Naturhistoriska Riksmuseet of Stockholm. Photograph by the author. X.25

PLATE VI. Lithraea molleoides var. Lorentziana Hieron. ex Lillo, Rambo 26310, Rio Grande do Sul, Brazil, 14 January 1945, in the Herbarium of the Fundacion Miguel Lillo of Tucuman, Argentina. Sometimes a leaf of Lithraea brasiliensis will be ternate and appear much as the leaves of Lithraea molleoides. The leaves of Lithraea molleoides and of Lithraea ternifolia are very similar, however, the fruit of the latter is nearly twice the diameter of the former. Photograph by the author.

Plate I

Plate II

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Plate VI

Index of Scientific Names

Duvaua pleuropogon Turcz. = 4. L. caustica

Ehretia venulosa Spreng. = 1. L. brasiliensis

Laurus caustica Mol. = 4. L. caustica

Lithraea Aroeirinha March. = 2.L. molleoides

1. Lithraea brasiliensis.

4. Lithraea caustica (Mol.) Hook & Arn.

Lithraea caustica f. pilosa (Engl.) Cabr. = 4a. L. caustica pilosa

4a. Lithraea caustica var. pilosa Engl.

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Lithraea verrucosa Miers ex Engl. = 1. L. brasiliensis

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Persea caustica Spreng. = 4. L. caustica

Rhus caustica Hook. & Arn. = 4. L. caustica

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COMMON NAMES FOR MIDWESTERN FOREST TREES

Kendall Laughlin
165 Pine Ave., Chicago, Ill.

SCIENTIFIC NAME	SUGGESTED COMMON NAME
Quercus Xmegaleia.....	Lyrarpa Oak
Quercus Xmutabilis.....	Miquoria Oak
Quercus Xdiscreta.....	Swope Oak
Crataegus acanthacolonensis	Thornhill Hawthorn
Crataegus disperma.....	Schiller Hawthorn
Crataegus mortonis.....	Morton Hawthorn
Crataegus vegeta.....	Calumet Hawthorn
Crataegus gemmosa.....	Alder Hawthorn
Crataegus leucantha.....	Glenview Hawthorn
Crataegus apiomorpha.....	Du Page Hawthorn
Crataegus lucorum.....	Grove Hawthorn
Crataegus paucispina.....	Shortspine Hawthorn
Crataegus macrosperma.....	Variable Hawthorn
Crataegus tortilis.....	Birchleaf Hawthorn
Crataegus magniflora.....	Magniflora Hawthorn
Crataegus blothra.....	Harmswoods Hawthorn
Vaccinium arboreum.....	Farkleberry
Forestiera acuminata.....	Swamp-Privet

The following statement of noble purpose appears on page 14 of the U.S.F.S. "Check List of Native and Naturalized Trees of the United States," Agriculture Handbook 41:

"Adoption of standardized English plant names increases clarity and reduces confusion, conduces to uniformity of usage, and, if the names are carefully and properly selected, contributes to best usage."

Dr. E. L. Little has apparently repudiated the above principle because he has declined to progress for handling by the U.S.F.S. Tree and Range Plant Name Committee all my proposals for common names.

"Standardized Plant Names," published in 1942 (hereinafter referred to as SPN), contains "more than 90,000 common and scientific names." Since this book was published many new species and hybrids have been discovered and described and new combinations have come to be recognized. The common names in this book are the same as in the Check List for the most part, but there are some differences. This book was prepared by the American Joint Committee on Horticultural Nomenclature. All the members of that committee are dead and there is no successor to the committee, so that no further action in that direction is possible.

No wild trees will be shown in the reissue of "Hortus Second," which will not be a worthy successor to SPN.

The 8th edition of Gray's Manual does not reveal much of an effort by its author to use the common names in either the Check List or SPN. "Bur Oak" and "Chinkapin Oak," the approved names for Q. macrocarpa and muehlenbergii, respectively, are not shown. Celtis occidentalis and laevigata are not distinguished by common names; both "Hackberry" and "Sugarberry" are shown above both species.

We Midwesterners are therefore faced with the deplorable situation that the Eastern savants have no interest in giving common names to Midwestern trees and too little interest in uniform nomenclature. It is shortsighted for dendrologists to think that their work is finished when they call a tree by a scientific name. There is such a thing as educating the public about trees. The man on the street, speaking English and not Latin, knows the objects that he is interested in by English names. If a tree has a scientific name and no common name, he regards the naming as a half-baked job.

I hope that the names in the list at the beginning of this article will be used by everybody. In most cases no other name has been suggested.

The following paragraphs set forth the justifications for the suggested common names. Where the common name is similar to the scientific name, no comment is necessary.

Quercus Xmegaleia Laughlin, lyrata X macrocarpa; Phytologia 8:153-159. "Lyrarpa" represents a telescoping of the specific epithets of the parent species.

Quercus Xmutabilis, palustris X shumardii; Phytologia 6:374-378. There is a hybrid-swarm in the Big Oak Tree State Park in Mississippi County, Missouri. "Miquoria" is a coined name and is made up as follows: Mi from Mississippi County and River; qu from Quercus; oria from Hicoria. It alludes to the magnificent Oaks and Hickories in that park.

Quercus Xdiscreta Laughlin, shumardii X velutina; Phytologia 7:410-416. "Swope" honors Swope Park, Kansas City, Mo., where the tree is found, and its donor, Thomas H. Swope.

Crataegus acanthacolonensis Laughlin; pp. 9-12 of my "Manual of the Hawthorns of Cook and Du Page Counties of Illinois." Most of the trees are on Thornhill in the Morton Arboretum. "Thornhill" is a translation of the Greek name.

Crataegus disperma; pp. 12-14 of my Hawthorn Manual. Schiller Woods is the center of dispersion of

this species in the Chicago region.

Crataegus vegeta; p. 19 of my Hawthorn Manual. Sargent reported this species from Calumet, Ill.; but it is found elsewhere in southern Cook County.

Crataegus gemmosa; pp. 20-21 of my Hawthorn Manual. Its thick olive green leaves resemble the Speckled Alder.

Crataegus leucantha Laughlin; pp. 22-23 of my Hawthorn Manual. The type tree is in the Glenview Woods in Glenview, Ill.

Crataegus apiomorpha; pp. 34-35 of my Hawthorn Manual. I have found this species only in Du Page County.

Crataegus lucorum. "Grove" is a translation of the Latin name.

Crataegus paucispina; pp. 36-37 of my Hawthorn Manual. The spines are distinctively short (as well as sparse).

Crataegus macrosperma Ashe. I called this species "Large-Seed Hawthorn" in my Hawthorn Manual because that was the name in the Check List. This name is very inappropriate because the nutlets are not large in any sense. "Variable Hawthorn," the name given to it by Peattie in his "Natural History of Trees of Eastern and Central North America," is more appropriate.

Crataegus tortilis; pp. 40-41 of my Hawthorn Manual. There is a slight resemblance in the shape of the leaves to the River Birch.

Crataegus blothra Laughlin; pp. 49-51 of my Hawthorn Manual. This tree is in Harms Woods in Glenview, Ill.

Vaccinium arboreum. "Farkleberry" is the name shown in SPN and Webster's Dictionary and is preferable to the Check List's "Tree Sparkleberry." There is nothing sparkling about this blueberry tree.

Forestiera acuminata. "Texas Forestiera," the name shown for this species in SPN, is a misnomer and properly applies to F. texana. Acuminata is a species of the lower Mississippi valley. "Swamp-Privet" is the name shown in the Check List and tree books.

NOVELTIES IN THE CUBAN FLORA. XIV.

by Brother Alain

AMARYLLIDACEAE

PANCRATIUM ARENICOLUM (Northrop) Alain, comb. nov.
Hymenocallis arenicola Northrop Mem. Torrey Club 12: 28. 1902.

PANCRATIUM PRATICOLUM (Britt. & Wils.) Alain, comb. nov.
Hymenocallis praticola Britt. & Wils. Mem. Torrey Club 16: 60.1920.
Hymenocallis stenophylla Urb. Repert. Sp. Nov. XXI: 53. 1925.

ORCHIDACEAE

CHONDRORRHYNCHA FLABELLIFORMIS (Sw.) Alain, comb. nov.
Epidendrum flabelliformis Sw. Prodr. 123. 1788.
Cymbidium flabelliformis Sw. Nov. Act. Upsal. VI: 73. 1799.
Zygopetalum cochleare Lindl. Bot. Reg. t. 1857. 1836.

CARYOPHYLLACEAE

DRYMARIA CUBANA Alain, nom. nov.
Pinosia glandulosa Alain. Candollea 17: 107. 1960.

MALPIGHIACEAE

BYRSONIMA PARVIFOLIA Alain, nom. nov.
Byrsonima martiana Acuña & Roig. Bol. Soc. Cub. Bot. X: 59. 1953,
non A. Juss. 1843.

STIGMAPHYLLON COCCOLOBAEFOLIUM Alain, sp. nov.

Frutex scandens usque 2 m altus; ramuli glabri, rami vetustiores sparse lenticellati; folia orbiculata vel reniformi-orbiculata, 1.5-3 cm longa, 1-3.5 cm lata, basi cordata, apice emarginata, margine applanata integra, glabra, coriacea, nervis subtus prominentibus, venis utrinque minute reticulatis; petiolo vix 1 mm longo, apice biglanduloso, glandulis breviter stipitatis; racemi contracti usque 18-flori, sessiles; bracteae lanceolatae, vix 1 mm longae; pedicelli floriferi ad basim articulati, bracteolis minutis vix 0.3 mm longis; sepala oblonga, glandulas 8 superantia; petala lutea suborbicularia, crenulata, 4 mm diametro; samarae nervis prominulis striatae, non reticulatae, ala 8 mm longa basi appendiculata.

CUBA: Oriente, Vía Sur, near Yateritas, on coastal rocks, Jan 10, 1956, *Alain & Morton 4955* (Typus: NY; Isotypi: LS, SV).

This species is related to *S. periplocifolia* (Desf.) Juss., but differs by being entirely glabrous, its flowers and samaras much smaller.

AQUIFOLIACEAE

ILEX SUBAVENIA Alain, nom. nov.
Ilex coriacea Alain Candollea 17: 117. 1960, not Chapm. 1860.

MYRTACEAE

MYRTEKMANIA ODIOLENS (Urb.) Alain, comb. nov.
Anomis odiolens Urb. Symb. Ant. 9: 471. 1928.
Myrtekmania clementis Alain Contr. Ocas. Mus. La Salle 12:10.1953.

BORAGINACEAE

BOURRERIA TURQUINENSIS Alain, sp. nov.

Frutex; rami hornotini striati, minute pilosuli; vetustiores glabri; folia alterna, 6-8 mm longe petiolata, petiolo supra canaliculato, sparse pilosulo; lamina elliptica, basi cuneata et in petiolo protracta, apice acuta vel subcuspidata, 3-6 cm longa, 2-3.3 cm lata, nervo medio supra impresso, subtus prominente, lateralibus utroque latere 3-4, supra obsoletis, subtus prominentibus, venis laxe reticulatis, margine plano vel paullo recurvo, supra nitida scabrosa pilis minutis albis basi tuberculatis, subtus glabra pallida, lamina chartacea; pedunculi solitarii, usque 3.3 cm longi, striati, sparse pilosuli 1-flori; bracteolae non visae; calyx campanulatus, 5 mm longus, glaber, lobi deltoideo-acuti, ciliolati, 1.5 mm longi; corolla non visa; ovarium globosum, styli pars basalis tantum vidi, 1.5 mm longa.

CUBA: Oriente, South slope of main peak, Pico Turquino, Oct 12-14, 1924, *G. Bucher 90* (Typus: NY).

This remarkable species is distinguished by the form and consistence of the leaves, the long and stout petioles, the long pedicel, the solitari flowers and the small calyx. It is to be placed in the affinity of *B. ovata* Miers.

RUBIACEAE

MACHAONIA HAVANENSIS (Jacq.) Alain, comb. nov.
?*Spermacoce havanensis* Jacq. ex Gmel. Syst. 234. 1796.
Spermacoce spinosa Jacq. Stirp. Amer. 21. 1763, not L. 1762, not *Machaonia spinosa* C. & S. 1829.
Machaonia calcicola Britt. Bull. Torrey Bot. Club 43: 453. 1916.

COMPOSITAE

WEDELIA CALYCINA L.C.Rich. in Pers. var. ACUMINATA (DC.) Alain, comb. nov.
Wedelia acuminata DC. Prodr. V: 541. 1836.
Verbesina formoso-cubana Maza. Periant. 274. 1890.
Wedelia jacquini var. *acuminata* O.E.Schulz Symb. Ant. 7:102.1911.

WEDELIA CALYCINA L.C.Rich. in Pers. var. CARACASANA (DC) Alain, comb. nov.
Wedelia caracasana DC. Prodr. V: 541. 1836.
Wedelia jacquini var. *caracasana* O.E.Schulz Symb. Ant. 7: 104. 1911.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. VI

Harold N. Moldenke

Two additional abbreviations employed herein for the names of herbaria whose material has been examined in the preparation of this work are: Hi = University of North Carolina, Chapel Hill, North Carolina, and Pm = Pharma Herbarium, CIBA, Basle, Switzerland.

VERBENA L., Mat. Med. 6 (1749), Sp. Pl., ed. 1, 1: 18. 1753; Gen. Pl., ed. 5, 12. 1754.

Additional & emended literature: Brunfels, Herb. Viv. Icon. 1: 119--120. 1532; Dorsten, Botanicon 292--294. 1540; Fuchs, Hist. Plant. Basil. 592. 1543; Ruel, Ped. Dioscorid. Anazarb., ed. 1, 317 (1549) and ed. 2, 519--521. 1551; Gesner, Collect. Stirp. 113. 1553; Matth., Comment. 466--467. 1554; Cord., Op. Posth. 66. 1561; Matth., Disc. Ped. Dioscor. Anazarb. 1106--1108. 1568; L'Obel, Plant. Obs. 231. 1576; Caesalp., De Plantis 450 & 451. 1583; Bejthe, Stirp. Nomencl. [14]. 1583; Gerarde, Herbal 580--582. 1597; L'Ecluse, Rar. Plant. Hist. 4: xlv--xlvi. 1601; Matth., Opera Omnia Comment. 741—742. 1624; J. Bauh., Hist. Plant. Univ. 3: 443--445. 1650; Imperato, Hist. Nat. 673—674. 1672; Matth., Apolog. 174 & 214. 1674; P. Herm., Hort. Acad. Lugd.-Bat. Cat. 619 & 699. 1687; Breyn, Prodr. Fasc. Rar. Pl., ed. 1, 2: 100. 1689; J. Bauh., Hist. Pl. Eur. 2: 494. 1689; Rivinus, Introd. Gen. Remherb. [24], Icon. [56] & [57]. 1690; P. Herm., Fl. Lugd.-Bat. 54—55. 1690; Pluk., Phytogr. 3: pl. 232, fig. 4, & 321, fig. 1. 1692; Petiver, Mus. Petiv. 60. 1695; P. Herm., Parad. Batav., ed. 1, 242, pl. 242. 1698; Tourn., Hist. Pl. Paris 309--310. 1698; Ray, Hist. Plant. 3: Suppl. 285--288 & App. 249. 1704; Boerh., Ind. Plant. Hort. Acad. Lugd., ed. 1, 75. 1710; Munting, Phytograph. Cur. 784. 1711; Boerh., Ind. Alt. Plant. Hort. Acad. Lugd., ed. 2, 1: 186—187 (1720) and ed. 3, 1: 186--187. 1727; Zannichell, Istor. Piante Venez. 273, pl. 269. 1735; L., Hort. Cliff. 10--11. 1737; Breyn, Prodr. Fasc. Rar. Pl., ed. 2, 2: 100. 1739; J. F. Gronov., Fl. Virg., ed. 1, 1: 7--8. 1739; A. van Royen, Fl. Leyd. Prod. 326—327 & 530. 1740; A. von Haller, Enum. Meth. Stirp. Helvet. 1: 551, 624, 634, 660, 661, 709, & 794. 1742; L., Fl. Suec., ed. 1, 9. 1745; Micheli, Cat. Plant. Hort. Caes. Florent. 98. 1748; L., Mat. Med. 6, 208, & 218. 1749; Dalib., Fl. Paris. 9. 1749; Sauvages, Meth. Fol. Pl. Fl. Monspel. 145, 248, 279, & 342. 1751; E. Blackwell, Cur. Herbal 1: pl. 41. 1751; L., Sp. Pl., ed. 1, 1: 18—21 & 342 (1753) and 2: 601, 630, & 660. 1753; L., Fl. Svec., ed. 2, 10. 1755; Kniphof, Bot. Orig. Herb. Viv. pl. [284]. 1757; Dodart, Mem. Serv. Hist. Pl., ed. 3, 627, pl. 35. 1758; J. F. Gronov., Fl. Virg., ed. 2, 4, 92, & 146. 1762; A. von Haller, Hist. Stirp. Indig. Helvet. 1: [96]--97 and 3: 183 & 202. 1768; Rosenstein, Kinder Krankh. 79. 1768; J. A. Murr. in L., Syst. Veg., ed. 13, 61--62. 1774; Haartm. in L.,

Amoen. Acad. 3: 35 & 43, pl. 2. 1775; Sabbat in Martelli, Hort. Roman. 3: 10—11, pl. 54—56. 1775; Pollich, Hist. Plant. Palat. 1: 22. 1776; O. F. Müll., Icon. Plant. Fl. Dan. 4: 5, pl. 628. 1777; Thunb., Fl. Jap. 22. 1784; Pulteney, Hist. & Biogr. Sketches Prog. Bot. England 1: 5—7. 1790; Lour., Fl. Cochinch., ed. 1, 1: 26--27 & 721 (1790) and ed. 2, 1: 33 & 881. 1793; Desf., Fl. Atlant. 1: 15—17. 1800; Lam. & DC., Fl. Franç. 3: 502—503. 1805; Poir. in Lam., Encycl. Méth. Bot. 8: 544—550 & 843—844. 1808; Picot de Lapeyr., Hist. Abrég. Pl. Pyrén. 12--13 & 652. 1813; Reichenb., Consp. Reg. Veg. 117 & 292. 1828; Bartl., Ord. Pl. 178. 1830; Reichenb., Fl. Germ. Exc. 334. 1830; Kunth, Handb. 391. 1831; Lindl., Einl. Syst. Bot. 355. 1833; H. E. Richter, Cod. Bot. Linn. 34--36. 1835; Mackay, Fl. Hibern. 208—209. 1836; W. D. J. Koch, Synops. Deutsch. & Schw. Fl., ed. 1, 578 & 844. 1837; W. D. J. Koch, Synops. Deutsch. & Schw. Fl. Ind. Gen. Spec. 99. 1838; Spenn. in Nees von Esenbeck, Gen. Plant. Germ. fasc. 21: 20 (420). 1839; E. Mey., Preuss. Pflanzengatt. 113. 1839; G. L. Petermann, Cod. Bot. Linn. Ind. Alph. 196. 1840; F. Krauss, Flora 28: 68. 1845; W. D. J. Koch, Synops. Deutsch. & Schw. Fl., ed. 2, 681 & 1206. 1846; A. Rich., Tent. Fl. Abyss. 2: 165—166. 1851; Zetterstedt, Pl. Vasc. Pyren. 220. 1857; Hofmeister, Jahrb. Wiss. Bot. 1: 140. 1858; Tornabene, Atti Accad. Gioen. Scien. Nat. Catania, ser. 2, 16: 125. 1860; Reichenb. f., Neuholl. Pfl. Am. Dietr. 9. 1866; Ascherson in Schweinf., Beitr. Fl. Aethiop. 1: 120. 1867; F. Muell., Fragm. 6: 153. 1868; Benth. & Muell., Fl. Austr. 5: 35--36. 1870; F. Muell., Fragm. 9: 5. 1875; Loret & Barrandon, Fl. Montpel. 532. 1876; C. Berg, Enum. Pl. Europ. 17 & 24. 1877; F. Muell., First Census 102. 1882; Franchet, Sert. Somal. 50. 1882; J. Sm., Dict. Pop. Names Pl. 428. 1882; H. Friend, Fls. & Flow. Lore 171, 313, 315, 529, 532--534, 545, 547, 548, 591, 607, 609, 610, & 615. 1883; F. M. Bailey, Syn. Queensl. Fl. 376. 1883; F. M. Bailey, Proc. Roy. Soc. Queensl. 1: 70. 1884; Tristram, Surv. West. Palest., ed. 1, 378. 1884; F. Muell., Key Victor. Pl. 2: 43 (1885) and 1: 397. 1887--1889; Tristram, Surv. West. Palest., ed. 2, 378. 1888; Stewart & Corry, Fl. North-east Ireland 285--286. 1888; F. Muell., Sec. Census 171. 1889; R. Tate, Handb. Fl. Extratr. South Austr. 155 & 254. 1890; H. C. Hart, Some Acct. Fauna Fl. Sinai 104. 1891; Engl., Über Hochgebirgsfl. Trop. Afr. 355--356. 1892; G. Watt, Dict. Econom. Prod. Ind. 6 (4): 229. 1893; Fiori & Paoletti, Icon. Flor. Ital. 380, fig. 3218. 1895; F. M. Bailey, Cat. Pl. Queensl. 35. 1890; Moore, Handb. Fl. N. S. Wales 356. 1893; Sieb. & Voss in Vilm., Blumeng., ed. 3, 1: 825. 1895; Mak., Bot. Mag. Tokyo 9: [321]. 1895; Gürke in Engl., Pfl. Ost-Afr. C: 337. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 254--258. 1898; J. L. Stewart, Punjab Pl. 166. 1899; "V. N.", Rev. Hort. Belg. 26: 76—77, fig. 15. 1900; F. M. Bailey, Queensl. Fl. 4: 1173. 1901; H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 207—210. 1901; J. K. Small, Fl. Southeast. U. S., ed. 1, 1009—1011 & 1337. 1903; Maiden, Proc. Linn. Soc. N. S. Wales [Fl. Norf. Isl.] 29: 712. 1904; Burbidge, Book Scented Gard. 74 & 95. 1905; F. M. Bailey,

Weeds & Poison. Pl. Queensl. 139, 141, & 143, fig. 243. 1906; Cheeseman, Man. N. Zeal. Fl. 1083. 1906; P. C. Standl., Contrib. U. S. Nat. Herb. 13: 161, 164, 171, & 211. 1910; C. M. Skinner, Myths & Legends 262. 1911; Nakai, Fl. Korea 2: 134. 1911; Felt, Journ. N. Y. Entomol. Soc. 20: 150--151. 1912; Matsum., Ind. 2 (2): 534. 1912; Britton & Br., Illustr. Fl., ed. 2, 3: 94--97, 599, 618, & 635, fig. 3552--3559. 1913; F. M. Bailey, Compreh. Cat. 382. 1913; Lévl., Cat. Pl. Yun-Nan 278. 1917; Basu, Ind. Medic. Pl. 3: 3, pl. 732. 1918; Holste, Zeitschr. Exper. Patholog. 19: 483. 1918; Quart. Journ. Geol. Soc. Lond. 76 (2): 157. 1920; Fitch & Sm., Ill. Brit. Fl., ed. 5, fig. 822. 1924; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 2238--2243, pl. 222 & 346, fig. 5, 3174, & 3175. 1927; Domin, Biblioth. Bot. 89 (VI): 1106. 1928; Seckt, Rev. Univ. Nac. Cordoba 17: 87--90, pl. 18, fig. 486. 1930; Marzell in Fedde, Repert. Beih. 61: 176. 1930; Eig in Fedde, Repert. Beih. 63: 172. 1931; Soest, Invl. Rivier. Fl. Gelderland 3 & 6. 1931; Grieve, Modern Herb. 830. 1931; Eig, Zohary, & Feinbrunn, Pl. Palest. 305--306. 1931; Crevost & Pételot, Bull. Econom. Indo-Chine 37: 1287. 1934; Dop in Lecomte, Fl. Gén. Indo-chine 4: 773 & 777--778, fig. 83, 4--7. 1935; Bourdier, Arch. Pharm. 273: 357. 1935; Reichert, Arch. Pharm. 273: 357. 1935; Buchli, Beitr. Geobot. Landes. Schweiz 19: 63. 1936; W. Young, Trans. & Proc. Bot. Soc. Edinb. 32: 114. 1936; Bedevian, Illustr. Polyglott. Dict. Pl. Names 609--610. 1936; Cheymol, Verbenaloside. 1937; Gonçalves da Cunha & Gonçalves Sobrinho, Revist. Fac. Ciencias 3: 5, 10, & 43. 1938; F. C. Hoehne, Plant. Subst. Veg. Tox. Med. 249--250. 1939; Kuwajima, Tohoku Journ. Exp. Med. 36: 28--43. 1939; Fern., Rhodora 42: 478. 1940; Oppenheimer & Evenari, Bull. Soc. Bot. Genèv., ser. 2, 31: [Fl. Cisiord.] 90 & 363. 1940; Robledo, Lecc. Bot. 2: 497. 1940; N. R. Hanson, Texas Wild Flow. Legends, ed. 2, 113. 1940; Gonçalves da Cunha & Gonçalves Sobrinho, Bol. Soc. Brot., ser. 2, 14: 11. 1940; Biswas, Ind. Forest Rec. Bot., new ser., 3: 42. 1941; Hutchinson & Bruce in Gillet, Kew Bull. 1941: 177. 1941; H. N. Webster, Herbs 27, 31, 32, & 64. 1942; Breitwieser, Pharmakogn. Untersuch. Verbenac. 1942; Rosengurtt, Estud. Prad. Nat. Urug. 3: [Fl. Palleros] 234--237. 1943; Yuncker, Bishop Mus. Bull. 178: 101. 1943; R. S. Woods, Naturalists' Lex. 271. 1944; Rozeira, Fl. Prov. Tras. & Alto Douro 164. 1944; Schnack & Covas, Darwiniana 6: 469—476, fig. 1—3. 1944; Roig, Plant. Med. Cuba 670--671 & 811. 1945; Schnack & Gonzalez, Revist. Argent. Agron. 12: 285--290. 1945; Rosengurtt, Estud. Prad. Nat. Urug. 5: [Fl. J. Jackson] 394—395, fig. 36. 1946; Schnack & Covas, Haumania 1: 5, [8], & 10, fig. 2 h & i. 1947; R. R. Tatnall, Fl. Del. 217--218. 1947; Kasapligil, Kuzey Anadol. Botanik Gezileri 74, 122, & 155. 1947; P'ei, Bot. Bull. Acad. Sin. 1: 2--3. 1947; Cabrera, Anal. Acad. Nac. Cienc. Nat. Buenos Aires 12: 22. 1947; Hager in Reichert, Trat. Farm. Práct. 5: 1214. 1948; Hausman, Begin. Guide Wild Fls. 26 & 375. 1948; Blossom, N. Y. Herald Trib., sect. 5, p. 14, July 25. 1948; Cabrera & Fabris, Publ. Tecn. 5 (2): [Pl. Acuat. Prov. Buenos Aires] 13. 1948; Cabrera, Lilloa 20: 175 & 337, cuadro I, III, IV, VII, VIII, XI, & XVII. 1949; La Estrella, p. 7, Jan. 22.

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Several of the bibliographic references given above occur in more or less erroneous form in literature; e.g., Gerarde, Herbal 580—582 (1597) is sometimes cited as page "781"; L'Ecluse, Rar. Plant. Hist. 4: xlv—xlvi (1601) is sometimes cited "Clus...xiv"; J. Bauh., Hist. Plant. Univ. 3: 443—445 (1650) is sometimes cited as "1651"; J. F. Gronov., Fl. Virg., ed. 1, 1: 7—8 (1739) is sometimes cited as "Clayt., Fl. Virg. 8. 1743"; A. van Royen, Fl. Leyd. Prod. 326—327 & 530 (1740) is sometimes cited as "Royen, Leyd. 161"; L., Mat. Med. 6, 208, & 218 (1749) is sometimes cited as page "38"; L., Sp. Pl. ed. 1, 1: 18—21 & 342 and 2: 601, 630, & 660 (1753) is sometimes cited as "878 & 879"; Kniphof, Bot. Orig. Herb. Viv. pl. [284] (1757) is sometimes cited as "cent. 12, no. 99"; J. A. Murr. in L., Syst. Veg., ed. 13, 61—62 (1774) is sometimes cited as page "66"; Lour., Fl. Cochinch., ed. 1, 26—27 & 721 (1790) is sometimes cited as page "33", which is the page in edition 2; Burbidge, Book Scented Gard. 74 & 95 (1905) is sometimes cited with the letters "n. e"; while the Treub, Ann. Jard. Bot. Buitenz. 3: 77—87 (1883) sometimes included in the bibliography of this genus contains no reference whatever to it.

Additions and emendations to the List of Excluded Species:

Verbena americ. frutesc. etc. Breyn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena americana frutescens etc. Breyn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena americana frutescens, teucrii foliis & facie, floribus caeruleo-purpurascentibus amplissimis Breyn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena americana frutescens, teucrii foliis, floribus coeruleo-purpurascentibus amplissimis Breyn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena americana latifolia etc. Magn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena americana latifolia, spica simplici longissima nigro-purpurea Magn. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena americana media annua ocimi folio lanuginoso, flore

purpureo amplo Breyn. = Bouchea prismatica (L.) Kuntze
Verbena americana media annua, ocimifolio lanuginoso, flore purpureo amplo Breyn. = Bouchea prismatica (L.) Kuntze
Verbena americana veronicae foliis, flore coccineo spicata Breyn. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena americana, veronicae foliis, flore coccineo spicata breynii Comm. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena botryoides major canadensis Munt. = Laportea canadensis (L.) Gaud., Urticaceae
Verbena bryoides maj. canad. Munt. = Laportea canadensis (L.) Gaud., Urticaceae
Verbena capensis folio capillacea Ray = Hebenstretia erinoides L. f., Selaginaceae
Verbena caudata americana flore pallidè coeruleo Munt. = Stachytarpheta jamaicensis (L.) Vahl
Verbena caule repente, foliis oblongis superne crenatis, pedunculis solitariis Gronov. = Phyla nodiflora (L.) Greene
Verbena caule repente, foliis oblongis superne crenatis, pedunculis solitariis capitatis Gronov. = Phyla nodiflora (L.) Greene
Verbena curassavica scutellariae foliis, flore purpurascente Herm. = Bouchea prismatica (L.) Kuntze
Verbena diandra L. = Stachytarpheta jamaicensis (L.) Vahl
Verbena diandra, spicis laxis, calycib. alternis prismaticis truncatis aristatis, fol. ovatis obtusis L. = Bouchea prismatica (L.) Kuntze
Verbena diandra, spicis laxis, calycib. fructus reflexis rotundato-didymis hispidis L. = Priva mexicana (L.) Pers.
Verbena diandra, spicis longis., calycib. aristatis, fol. ovatis, argute serratis L. = Ghinia curassavica (L.) Millsp.
Verbena diandra, spicis longiss. carnosis nudis, fol. lanceolato-ovat., oblique dentatis, caule laevi L. = Stachytarpheta indica (L.) Vahl
Verbena diandra, spicis longiss., foliosis L. = Stachytarpheta orubica (L.) Vahl
Verbena diandra, spicis ovat., fol. lanceolat. serrato-plicatis, caule fruticoso Royen = Phyla stoechadifolia (L.) Small
Verbena dispermos americana lignescens veronicae foliis Moris. = Bouchea prismatica var. longirostra Grenz.
Verbena femina Brunf. = Erysimum officinale L., Brassicaceae
Verbena fol. ovat. acuminatis, spica foliolosa L. = Stachytarpheta orubica (L.) Vahl
Verbena fol. subrot. serrato etc. Sloane = Stachytarpheta jamaicensis (L.) Vahl
Verbena foliis lanceolatis plicatis, spicis ovatis, caule fruti-

coso Royen = Phyla stoechadifolia (L.) Small
Verbena foliis lanceolatis, spica carnosa nuda Royen = Stachytarpheta jamaicensis (L.) Vahl
Verbena foliis obtuse ovalibus, spica carnosa nuda L. = Stachytarpheta jamaicensis (L.) Vahl
Verbena foliis ovatis acuminatis, spica foliolosa L. = Stachytarpheta orubica (L.) Vahl
Verbena folio subrotundo serrato, flore caeruleo Sloane = Stachytarpheta jamaicensis (L.) Vahl
Verbena folio subrotundo serrato flore coeruleo Sloane = Stachytarpheta jamaicensis (L.) Vahl
Verbena fruticosa Millsp. = Phyla nodiflora var. reptans (H.B.K.) Moldenke & P. strigulosa (Mart. & Gal.) Moldenke
Verbena indica Bont. = Stachytarpheta jamaicensis (L.) Vahl
Verbena indica lanuginosa Bod. = Manulea rubra L. f., Scrophulariaceae
Verbena mariana, rosae chin. fol. etc. Petiv. = Phryma leptostachya L., Phrymaceae
Verbena mexican. L. = Priva mexicana (L.) Pers.
Verbena mexicana, trachelii fol. etc. Dill. = Priva mexicana (L.) Pers.
Verbena mexicana, trachelii fol., fructu aparines Dill. = Priva mexicana (L.) Pers.
Verbena minima, chamaedr. fol. Sloane = Bouchea prismatica (L.) Kuntze
Verbena minima, chamaedros fol. Sloane = Bouchea prismatica (L.) Kuntze
Verbena minima chamaedryos folio Sloane = Bouchea prismatica (L.) Kuntze
Verbena; nodiflora C. Bauh. = Phyla nodiflora (L.) Greene
Verbena nodiflora capite oblongo, seu V. nodiflora imperati Barrel. = Phyla nodiflora (L.) Greene
Verbena nodiflora curassavica, foliis menthae Herm. = Ghinia curassavica (L.) Millsp.
Verbena nodiflora, foliis minoribus viridibus Moris. = Phyla nodiflora (L.) Greene
Verbena, nodiflora, foliis minoribus, viridibus Moris. = Phyla nodiflora (L.) Greene
Verbena nodiflora incana curassavica latifolia Herm. = Phyla nodiflora (L.) Greene
Verbena nodiflora incana, curassavica latifolia Herm. = Phyla nodiflora (L.) Greene
Verbena orubica, teucrii fol. etc. Pluk. = Stachytarpheta mutabilis (Jacq.) Vahl
Verbena orubica, teucrii fol., primulae veris fl., siliq. et

seminib. longissimis Pluk. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena orubica, teucrii folio, primulae veris flore, siliquis & seminibus longissimis Pluk. = Stachytarpheta mutabilis (Jacq.) Vahl

Verbena racemo simpliciss. etc. Gronov. = Phryma leptostachya L., Phrymaceae

Verbena racemos simplicissimo, floribus sessilibus, calycibus fructus reflexis, racemoque appressis Gronov. = Phryma leptostachya L., Phrymaceae

Verbena recta & mas Gesn. = Erysimum officinale L., Brassicaceae

Verbena repens nodifl. Burm. = Phyla nodiflora (L.) Greene

Verbena repens nodiflora Park. = Phyla nodiflora (L.) Greene

Verbena rubra Rumph. = Aerva sanguinolenta (L.) Blume, Amaranthaceae

Verbena scutellariae foliis dispermos americana Pluk. = Bouchea prismatica (L.) Kuntze

Verbena scutellariae s. cassid. fol. etc. Pluk. = Bouchea prismatica (L.) Kuntze

Verbena, scutellariae, s. cassidae fol., dispermos americ. Pluk. = Bouchea prismatica (L.) Kuntze

Verbena scutellariae sive cassidae folio dispermos Pluk. = Bouchea prismatica (L.) Kuntze

Verbena spicata jamaicana etc. Pluk. = Stachytarpheta jamaicensis (L.) Vahl

Verbena spicata jamaicana teucrii pratensis folio, dispermos Pluk. = Stachytarpheta jamaicensis (L.) Vahl

Verbena spicata jamaicana, teucrii pratensis folio, dispermos Pluk. = Stachytarpheta jamaicensis (L.) Vahl

Verbena tetrandra, calyc. subrotundis erectiusc., sem. echinatis L. = Priva lappulacea (L.) Pers.

Verbena tetrandra, spicis capitato-conicis, foliis serratis, caule repente L. = Phyla nodiflora (L.) Greene

Verbena tetrandra; spicis capitato-conicis; foliis serratis; caule repente L. = Phyla nodiflora (L.) Greene

The following thirteen pre-linnean names have not as yet been satisfactorily identified by me. I, any of the readers of this paper, specialists in the regions involved, know to what plants these names actually apply, it would be most deeply appreciated if this information were communicated to me:

Verbena americana radice grumosa Munting apud Ray, Hist. Plant. 3: Suppl. 285. 1704.

Verbena foliis planta aethiopica quadricapsularis, flore parvo calathoide coeruleo Pluk. apud Ray, Hist. Plant. 3: Suppl. 286. 1704.

Verbena fructu in singulis capitulis echinatis, unico flore albo

Sabbat in Martelli, Hort. Roman. 3: 11. 1775.
Verbena guineensis folio integro serrato glabro Ray, Hist. Plant. 3: Suppl. App. 249. 1704.
Verbena hyssopi foliis parvis è Cap. Boe. Spei Petiv. apud Ray, Hist. Plant. 3: Suppl. 286. 1704.
Verbena indica, rotundifolia, spicis comosis Mus. Zeyl. pag. 58 an Bliti superius descripti species? an vero Verbena nodiflora, major, indica, flore niveo hermanni apud Moris. tom. 3, pag. 419? Herm., Thes. Zeyl. 228. 1737.
Verbena nodiflora incana minor Indiae Orientalis, Poordela Malabarorum Pluk. apud Ray, Hist. Plant. 3: Suppl. 286. 1704.
Verbena nodiflora major indica flore niveo, hermanni Morison, Pl. Hist. Univ. Oxon. 3: 419. 1699.
Verbena nodiflora major indica, flore niveo hermanni Moris. apud Ray, Hist. Plant. 3: Suppl. 287. 1704.
Verbena pervana perpetvo virens J. Bauh., Hist. Plant. Univ. 3: 444—445. 1650.
Verbena scorodoniae folio spicata marilandica D. Sherard apud Ray, Hist. Plant. 3: Suppl. 287. 1704.
Verbena taxi foliis, marginibus lanuginosis Petiv. apud Ray, Hist. Plant. 3: Suppl. 286. 1704.
Verbena trachely, ruvidis foliis, fructu aparines H. Eyst. apud Sabbat in Martelli, Hort. Roman. 3: 11. 1775.

Additions to the list of known hybrids:

xVerbena gonzalezi Moldenke = Verbena santiaguensis (Covas & Schnack) Moldenke x V. perakii (Covas & Schnack) Moldenke

xVerbena perplexa Moldenke = V. gooddingii Briq. x V. bipinnatifida Nutt.

xVerbena tentamenta Moldenke = V. perakii (Covas & Schnack) Moldenke x V. peruviana (L.) Britton

It is worthy of note that Lamarck & DeCandolle, Fl. Franç. 3: 502—503 (1805) say of Verbena: "Ce genre, placé par Lamarck dans les Labiées, et par Jussieu dans les Pyrénacées, établit la liaison naturelle de ces deus familles."

VERBENA ABRAMSI Moldenke

Additional literature: Moldenke, Phytologia 8: 142--145 (1961) and 8: 177. 1962; Moldenke, Résumé Suppl. 3: 8. 1962.

Brock found this species growing in very heavy damp soil by old well-pipes, along with Hypericum anagalloides C. & S., H. formosum H.B.K., and Gnaphalium chilense Spreng.

Additional citations: CALIFORNIA: Madera Co.: Brock 297 (Hi--204019).

xVERBENA ADULTERINA Hausskn.

In my Alph. List Invalid Names Suppl. 1: 22 (1947) I reduced this binomial to synonymy under V. officinalis L. and followed this disposition of it as late as my Résumé in 1959. It is only

since the latter date that I have decided to keep it apart.

VERBENA ALATA Sweet

Additional & emended literature: Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 147. 1894; Reitz, Sellowia 13 (13): 110. 1961.

VERBENA AMBROSIFOLIA Rydb.

Additional literature: Moldenke, Phytologia 2: 126 (1945), 8: 149--152 (1961), and 8: 177--181, fig. 2. 1962; Moldenke, Résumé Suppl. 3: 7. 1962.

VERBENA AMBROSIFOLIA f. EGLANDULOSA Perry

Additional literature: Moldenke, Phytologia 8: 181--183. 1962; Moldenke, Résumé Suppl. 3: 37. 1962.

VERBENA ARAUCANA R. A. Phil.

Additional literature: Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 50. 1951; Moldenke, Phytologia 8: 187--188. 1962.

Acevedo de Vargas states that "El tipo de esta especie, conservado en nuestro herbario museal, ha sido confundido con una planta del herbario del Museo de Berlin, cuya foto ha sido distribuída por Field Mus. Nat. Hist. 17401" (Sg--66908).

VERBENA ARENARIA Moldenke

Literature: Moldenke, Phytologia 8: 59--60 (1961) and 8: 188--189. 1962; Moldenke, Résumé Suppl. 3: 14. 1962.

xVERBENA ARGENTINA Moldenke

Literature: Moldenke, Phytologia 8: 60 (1961) and 8: 189. 1962; Moldenke, Résumé Suppl. 3: 14. 1962.

VERBENA ATACAMENSIS Reiche

Additional literature: Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 51. 1951; Moldenke, Phytologia 8: 191--192. 1962.

The type of this species was collected in September, 1900, and is No. 54771 in the herbarium of the Museo Nacional de Historia Natural in Santiago, Chile. Acevedo de Vargas cites, in addition, R. A. Philippi s.n. [Paposo, XII.1853] (Sg--42477, Sg--54753) and Reiche s.n. [Taltal-Paposo, IX.1909] (Sg--61450) from Antofagasta. She notes that the species has been confused in her herbarium with V. laciniata (L.) Briq.

VERBENA AURANTIACA Speg.

Additional descriptive data: Branches 16--40 cm. long, 1--2 mm. thick, somewhat twiggy, leafless below, prostrate-diffuse, arcuate-ascending above, with only a few leaves; principal internodes 2--7 cm. long, smooth or slightly 2-striate at the branchings; leaves shorter than the internodes, often bearing 2--4 slightly smaller leaves in their axils, rather thick-membranous in drying, often subglaucescent, 1-nerved, sometime spatulate or obovate,

often obtusely rounded at the apex, 1--2.5 cm. long, 2--14 mm. wide, the lower ones larger and broader, the upper ones shorter and narrower (often linear or linear-lanceolate), the lobes obtuse; inflorescence often borne on peduncle-like elongate branches 3--8 cm. long, leafless or with 2 linear leaflets 5--15 mm. below the flowers, rarely with 1 or 2 aborted flower-heads, the spikes 8--16-flowered, at first rather compact-capitate, 15 mm. long and wide, but after anthesis elongating to 30 mm. long and only 5 mm. wide; bractlets often linear or lanceolate, rather acute at the apex, often hirsutulous-pubescent with appressed hairs; calyx cylindric or tubular, subterete, 8--10 mm. long, 2 mm. wide, plainly or obscurely 5-ribbed, canescent-pubescent with appressed hairs on the outside, glabrous within, the rim very shortly 5-dentate, the teeth triangular, subacute, irregular or subequal; corolla-tube 12--16 mm. long, 1--1.5 mm. wide, subterete, scarcely inflated and very slightly incurved at the apex, retrorse-hispidulous on the inner surface, the limb spreading, the lobes obovate-truncate, slightly emarginate at the apex; stamens 4, tetradynamous; anthers often included, yellow, not appendaged; fruit not known.

The species was based by Spegazzini on two collections described by him as follows: "In pratis siccis sabulosis prope Lago Argentino, anno 1884 (T. F.) et in Golfo de Se San Jorge, Febr. 1896 (C. A)."

VERBENA AUSTRALIS Moldenke

Additional literature: Moldenke, Phytologia 8: 193—194. 1962.

Additional citations: BRAZIL: Paraná: Braga & Lange 328 (W—2369350).

xVERBENA BAILEYANA Moldenke

Additional synonymy: Verbena tetrandra L. apud Peterm., Cod. Bot. Linn. Ind. Alph. 196. 1840.

Additional literature: Lam., Tabl. Encycl. Méth. Bot. 1: 57. 1791; H. E. Richter, Cod. Bot. Linn. 35. 1835; Peterm., Cod. Bot. Linn. Ind. Alph. 196. 1840; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1894; Moldenke, Phytologia 8: 194—196.1962.

Petermann (1840) cites the synonym given above as "V. tetrandra Diss. de Pl. Hybr. 161. obs.", implying Linnean authorship.

Briquet (1894) was of the opinion that V. pinnatifida Lam. represents this hybrid, too. This may be true, but until Lamarck's type specimen can be examined, I am not ready to say so. His original description is "Verbena pinnatifida. V. spicis filiformibus, foliis inciso-pinnatifidis grosse serratis. Ex America septentrionali ¼."

VERBENA BALANSAE Briq.

Additional literature: Reitz, Sellowia 13 (13): 110. 1961; Moldenke, Phytologia 8: 197—199. 1962.

VERBENA BERTERII (Meisn.) Schau.

Additional literature: Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 51—52. 1951; Moldenke, Phytologia 8: 202—205. 1962; Moldenke, Résumé Suppl. 3: 36. 1962.

Acevedo de Vargas, in the reference cited above, cites the following specimens not as yet seen by me: Aconcagua: Landbeck s.n. [XI.1862] (Sg—54737). Curicó: Landbeck s.n. [XI.1861] (Sg—42468, Sg—54758, Sg—68400). Maule: Reiche s.n. [XI."1990"] (Sg—68401), s.n. [X.1907] (Sg—60915). Ñuble: Collector undesignated s.n. (Sg—42466, Sg—68403); Puga s.n. [X.1878] (Sg—68402). O'Higgins: Bertero s.n. [X-XI.1828] (Sg—54755). Santiago: C. Gay 1084 (Sg—54734). Valparaíso: Quilpué s.n. [X.1891] (Sg—68399). Province undetermined: Volckmann s.n. [San Rafael, 1862—3] (Sg—54735).

VERBENA BERTERII f. ALBIFLORA Moldenke

Additional literature: Moldenke, Phytologia 8: 205. 1962; Moldenke, Résumé Suppl. 3: 13 & 14. 1962.

VERBENA BIPINNATIFIDA Nutt.

Additional literature: Ranson, Texas Wild Fl. Legends, ed. 2, 113. 1940; Moldenke, Phytologia 8: 207—216, fig. 3. 1962; Moldenke, Résumé Suppl. 3: 4, 6, 7, 29, & 36. 1962; Vaughan, Gard. Illustr. 86: 71. 1962; Park's Flower Book 1962: 36. 1962; A. Putz, N. Y. Herald Trib., sec. 4, p. 18, Feb. 4. 1962.

Park (1962) describes this species as "a showy 15-inch everblooming perennial in lavender-blue with lovely fern-like foliage", calls it the "fern verbena", and offers 100 seeds for 25 cents (his no. 2055).

The Britt 2281 distributed as this species is actually V. temisecta Briq., Darrow s.n. [March 20, 1938] is the type collection of xV. perplexa Moldenke, and Lawrence & Surber s.n. [3-27-60] is V. gooddingii Briq.

A natural hybrid with V. gooddingii has been found in several places where the ranges of the two species overlap and is discussed herein under xV. perplexa.

Additional citations: MISSISSIPPI: Lee Co.: J. D. Ray 5858 (Hi—199596). Sharkey Co.: J. D. Ray 4923 (Hi—199709). ARKANSAS: Clark Co.: Demaree 44954a (Ca). Hempstead Co.: Demaree 44912 (Ca), 44963 (Ca). KANSAS: Ellis Co.: C. S. Sheldon 323 (Hi—59443). TEXAS: Bell Co.: LeClair s.n. [Aug. 6, 1937] (Hi—9120). Dallas Co.: C. L. Lundell 1275 (Hi—54131); Lundell & Lundell 11315 (Hi—59615).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry

Additional & emended literature: Moldenke, Phytologia 2: 127 (1945) and 8: 242—244. 1962.

xVERBENA BLANCHARDI Moldenke

Additional literature: Moldenke, Résumé Suppl. 3: 4, 6, 36, &

38. 1962; Moldenke, Phytologia 8: 244--246. 1962.

VERBENA BONARIENSIS L.

Additional synonymy: Verbena foliis lanceolatis, spicis congestis fastigiatis L. apud A. van Royen, Fl. Leyd. Prod. 326. 1740. Verbena tetrandra, spicis fasciculat., fol. lanceolatis amplexicaulib. L. apud H. E. Richter, Cod. Bot. Linn. 35. 1835. Verbena fol. lanc., fl. congestis fastigiatis L. apud H. E. Richter, Cod. Bot. Linn. 35. 1835. Verbena bonariensis altiss., laveendulae canariensis fol., spica lavendulae Dill. apud H. E. Richter, Cod. Bot. Linn. 35, in syn. 1835. Verbena bonariensis altiss. etc. Dill. apud Peterm., Cod. Bot. Linn. Ind. Alph. 196, in syn. 1840.

Additional & emended literature: Sabbat in Martelli, Hort. Roman. 3: 10--11, pl. 54. 1775; H. E. Richter, Cod. Bot. Linn. 35. 1835; Peterm., Cod. Bot. Linn. Ind. Alph. 196. 1840; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 147. 1894; Baker & Stapf in Thiselt.-Dyer, Fl. Trop. Afr. 5: 286. 1900; Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 52. 1951; A. Putz, N. Y. Herald Trib., sect. 4, p. 18, Feb. 4. 1962; Moldenke, Phytologia 8: 246--265, fig. 4. 1962.

Sabbat (1775) includes the names "Verbena americana, spica multiplici, foliis urticae angustissimis, floribus caeruleis [spelled thus on p. 11; spelled "coeruleis" on pl. 54]" and "Verbena altissima, americana" in the synonymy of this species, but these names more properly belong to what is now known as V. hastata L. Sabbat's color plate is very definitely V. bonariensis. Apparently this is a case of misidentification on his part.

The Kniphof reference given in the synonymy of V. bonariensis is sometimes cited as "Cent. 12, no. 99". He himself cites a "Dudw. D. G. P. 222", which has not as yet been located by me.

The A. E. Radford 22769 distributed as V. bonariensis is actually var. conglomerata, while Montes 9553 and Osorio 662 are V. montevidensis Spreng.

Recent collectors have found the species in fields, weedy areas along railroads, river bottoms, wastelands, the edge of woods, in low fallow fields and low woods, and among granite boulders.

Acevedo de Vargas (1951) cites the following specimens not as yet seen by me: CHILE: Colchagua: Bertero s.n. [Rancagua, II. 1828] (Sg--54690). Coquimbo: Landbeck s.n. [XII.1862] (Sg--54702). Curicó: Collector undesignated s.n. [Teno inferior, II.1896] (Sg-68326). Llanquihue: Collector undesignated s.n. [Osorno] (Sg--65717); R. A. Philippi s.n. [Osorno, II.1852] (Sg--54687). Maule: Reiche s.n. [X.1890] (Sg--68328). Ñuble: M. A. Solis s.n. [III. 1864] (Sg--54688). Santiago: Guzmán s.n. [XI.1943] (Sg--59935). Valdivia: Collector undesignated s.n. [San Juan, III.1862] (Sg--

42452); C. Gay 1113 (Sg—54689).

Additional citations: NORTH CAROLINA: Carteret Co.: P. J. Crutchfield 556 (Hi—104739). Gates Co.: Ahles & Duke 44608 (Hi—110661). Hertford Co.: Ahles & Duke 45941 (Hi—121528). Robeson Co.: Ahles & Haesloop 28827 (Hi—104735); Britt 2476 (Hi—180052). Washington Co.: A. E. Radford 35209 (Hi—104734); Wood & Clement 6950 (Hi—51275). SOUTH CAROLINA: Aiken Co.: A. E. Radford 514 (Hi—14535). Allendale Co.: Ahles & Bell 15880 (Hi—92930). Bamberg Co.: Ahles & Haesloop 30616 (Hi—104743). Berkeley Co.: Ahles & Haesloop 26487 (Hi—104741, Hi—104742). Calhoun Co.: Ahles & Haesloop 25657 (Hi—104740). Charleston Co.: Ahles & Haesloop 25706 (Hi—104738). Chester Co.: C. R. Bell 9615 (Hi—93399). Dillon Co.: Ahles & Haesloop 27786 (Hi—104737); Ahles & Leisner 32180 (Hi—104736). Edgefield Co.: A. E. Radford 22525 (Hi—93397). Fairfield Co.: C. R. Bell 9451 (Hi—92906). Florence Co.: C. R. Bell 7623 (Hi—92902). Georgetown Co.: A. E. Radford 24991 (Hi—92903). Lee Co.: A. E. Radford 27248 (Hi—92904). Marion Co.: C. R. Bell 7879 (Hi—92907). Marlboro Co.: A. E. Radford 12473 (Hi—92931). McCormick Co.: A. E. Radford 22293 (Hi—92908). Newberry Co.: C. R. Bell 9078 (Hi—92909); O. M. Freeman 56492 (Hi—92932). Williamsburg Co.: A. E. Radford 24714 (Hi—92910). LOUISIANA: Bossier Par.: Moore & Moore 6157 (Hi—131972). BRAZIL: Rio Grande do Sul: Sehnem 5598 (B). BOLIVIA: Cochabamba: A. Jimenez 83 (W—2369922). URUGUAY: H. H. Bartlett 20710 (W—2320144).

VERBENA BONARIENSIS f. ALBIFLORA Moldenke

Additional literature: Moldenke, Phytologia 8: 265. 1962.

Additional citations: BRAZIL: Paraná: Hatschbach 7371 (Z).

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional literature: Moldenke, Phytologia 8: 265—267. 1962.

Radford found this plant in waste places, flowering in May.

Additional citations: SOUTH CAROLINA: Abbeville Co.: A. E. Radford 22769 (Hi—92901).

VERBENA BRACTEATA Lag. & Rodr.

Additional synonymy: Verbena bractiosa Michx., in herb.

Additional & emended literature: Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1894; P. C. Standl., Contrib. U. S. Nat. Herb. 13: 164 & 211. 1910; Perry, Rhodora 38: 271. 1936; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; H. V. Sm., Mich. Wildfls. 315, 317, & 465, pl. 155. 1961; Moldenke, Résumé Suppl. 3: 1, 2, 4—8, 36, & 41. 1962; Moldenke, Phytologia 8: 267—272. 1962.

Additional illustrations: H. V. Sm., Mich. Wildfls. pl. 155. 1961.

The type of V. confinis Greene was collected at an altitude of 2695 meters.

Verbena bracteata has been found by collectors in dry sunny places, fields, and pastures, on sandy lake shores, and among the bricks of sidewalks. The Stewarts report it as dominant on a dry lake bottom in Oregon. It has been collected at altitudes of 1300 to 8085 feet. It has been confused in herbaria with Salvia reflexa Hornem.

Additional citations: BRITISH COLUMBIA: Yale Co.: Krajina s.n. [Okanagan Lake, July 29, 1952] (Hi—196683). NEW YORK: Suffolk Co.: E. J. Alexander s.n. [Montauk Point] (Hi—141554). NORTH CAROLINA: Orange Co.: Collector undesignated s.n. (Hi—59457). ILLINOIS: Peoria Co.: F. E. McDonald s.n. [Peoria, July 1887] (Hi—59446). KENTUCKY: Jefferson Co.: C. R. Gunn J.189 (Hi—191334). MICHIGAN: Cheboygan Co.: J. H. Ehlers 2062 (Hi—143746). SOUTH DAKOTA: Lawrence Co.: F. L. Bennett 618 (Hi—50681). KANSAS: Montgomery Co.: R. L. McGregor 11594 (Hi—195784). NEVADA: Clark Co.: Clokey 8096 (Hi—15952). COLORADO: Boulder Co.: Ewan Pl. Exsicc. Gray. 1090 (Hi—21987). Larimer Co.: C. S. Sheldon 38 (Hi—10098). OKLAHOMA: Beaver Co.: Hindman 202 (Hi—195859). Payne Co.: L. C. Rutledge 23 (Hi—195972). ARIZONA: Apache Co.: H. R. Totten s.n. [Springerville, June 21, 1930] (Hi—59445). Coconino Co.: P. O. Schallert s.n. [September 1, 1943] (Hi—59444). Maricopa Co.: J. Rivera 40 (Hi—191384). Mohave Co.: Ahles 9223 (Hi—102931). OREGON: Harney Co.: Stewart & Stewart 6838 (Hi—204066). CALIFORNIA: Fresno Co.: Beylik 59 (Hi—204030).

VERBENA BRASILIENSIS Vell.

Additional literature: Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 52. 1951; Reitz, Sellowia 13 (13): 110. 1961.

The O. M. Freeman 56492, distributed as this species, is actually V. bonariensis L.

Acevedo de Vargas (1951) cites the following specimens not as yet seen by me: CHILE: Santiago: Collector undesignated s.n. (Sg-68323); J. Guzmán s.n. [X.1943] (Sg—59934).

Additional citations: SOUTH CAROLINA: Jasper Co.: Mrs. E. O. Mellinger 336 (Hi—134362). GEORGIA: Richmond Co.: Duke & Ahles 2014 (Hi—112976). ARKANSAS: Conway Co.: Demaree 44815 (Ca). ARGENTINA: Mendoza: Ruiz Leal 1015 (N), 3056 (N), 4525 (N), 4528 (N), 4899 (N), 5599 (N), 8090 (N), 8398 (N), 9660 (N); Sanzin 274 [Herb. Osten 12817] (Ug); Semper 342 (S); Villafañe 794 (N, N), 868 (N), 917 (N, St), 950 (N), 970 (N), 1031 (N). Misiones: T. Meyer 5386 (Ut—115415b); D. Rodriguez 223 [Herb. Inst. Miguel Lillo 31407] (N). Río Negro: T. Meyer 7054 (Ut—115422b). Salta: A. T. Hunziker 1035 (N). San Juan: Cuezzo 1290 (Gg—352668, N), 1402 (N), 1462 (N), 1744 (N), 2123 (N), 2210 (Gg—353265, N), 2239 (Gg—353266, N). Santa Fé: Job 686 (N, S); Ruiz Huidobro 3163 (N); Sparre 389 (S); Terribile 536 (N).

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NOTES ON NEW AND NOTEWORTHY PLANTS. XXXII

Harold N. Moldenke

AEGIPHILA SESSILIFLORA var. CUATRECASASI Moldenke, var. nov.

Haec varietas a forma typica speciei pedicellis fructiferis percrassis usque ad 17 mm. longis, calicibus fructiferis campanulatis percrassis usque ad 10 mm. longis et 17 mm. latis verrucosis perspicue lobatis, et drupis carnosis 2 cm. longis latisque recedit.

This variety differs from the typical form of the species in having solitary fruits, the fruiting-pedicels very thick, to 17 mm. long, the fruiting-calyx coriaceous, campanulate, to 10 mm. long and 17 mm. wide, verrucose, and the drupes fleshy, 2 cm. long and wide.

The type of the variety was collected by José Cuatrecasas Arumi and Rafael Romero Castañeda (no. 25404) in the forest at Hacienda Nuevo Horizonte, El Podrido, Sierra de Perijá, east of Manaure, Magdalena, Colombia, on November 16, 1959, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

AEGIPHILA VITELLINIFLORA var. EGLERI Moldenke, var. nov.

Haec varietas a forma typica speciei calicibus parcissime pilosis vel subglabratis recedit.

This variety differs from the typical form of the species in having the calyxes during anthesis very sparsely pilose with long twisted hairs or subglabrate.

The type of the variety was collected by H. S. Irwin, W. A. Egler, and J. Murça Pires (no. 47162) on riverbanks between Oiapoque and Santo Antonio, on the Rio Oiapoque, Amapá, Brazil, on July 26, 1960, and is deposited in the Britton Herbarium at the New York Botanical Garden. It is named in honor and commemoration of Walter Alberto Egler, whose tragic death by drowning while on a botanical expedition was a great loss to Brazilian botany.

CALLICARPA ERIOCLONA f. GLABRESCENS Moldenke, Résumé Suppl. 4: 9, nom. nud. 1962; f. nov.

Haec forma a forma typica speciei foliis maturitate subtus parce parcissimeve stellato-pubescentibus vel glabrescentibus recedit.

This form differs from the typical form of the species in having the mature leaf-blades varying from rather sparsely to very sparsely stellate-pubescent or even glabrescent and resinous-punctate on the lower surface.

The type of the form was collected by Takahide Hosokawa (no. 8398) at Tadiu, on Truk island, Caroline Islands, on August 11, 1936, and is deposited in the herbarium of the Bernice P. Bishop Museum in Honolulu.

ERIOCAULON CONGOLENSE Moldenke, Résumé Suppl. 4: 7, nom. nud. 1962; sp. nov.

Herba parva annua; foliis numerosissimis lineari-filiformibus erecto-patentibus pellucidis glabris fenestratis apiculatis; pedunculis numerosis erectis filiformibus tricostatis stramineis glabris parce contortis; vaginis laxiusculis; capitulis oblongo-obovatis paucifloris.

Small tufted herb, apparently annual, to 5.5 cm. tall; leaves very numerous, linear-filiform, erect-spreading, 1.3--2.4 cm. long, less than 1 mm. wide, pellucid, glabrous, plainly fenestrate, apiculate at the apex; peduncles several or numerous per plant, erect, filiform, 2.5--5 cm. long, 3-costate, stramineous, glabrous or practically so, slightly twisted; sheaths rather loose, about equaling the leaves and similar to them in texture and color; heads oblong-obovate, 1.5--2.5 mm. wide, 2--3 mm. long, few-flowered; involucral bractlets obovate-elliptic, golden-stramineous, about 2.3 mm. long and 1.4 mm. wide, acute at the apex, glabrous, shiny; receptacle glabrous; receptacular bractlets oblong, about 2.1 mm. long and 0.7 mm. wide, cream-colored, glabrous; staminate florets not seen; pistillate florets: sepals 3, separate, linear, hyaline, about 1.4 mm. long and 0.1 mm. wide; petals 3, separate, linear; ovary subglobose, about 0.5 mm. long and wide, glabrous, 3-sulcate, 3-celled, 3-ovulate; style about 0.5 mm. long, its branches about 0.7 mm. long.

The type of this species was collected by Théodore Monod (no. 11642) at a pond between Handa and Niangara, province of Stanleyville, Congo, on July 30, 1956, and is deposited in the herbarium of the Institut Française d'Afrique Noire at Dakar.

ERIOCAULON GUINEENSE Moldenke, Résumé Suppl. 4: 6, nom. nud. 1962; sp. nov.

Herba annua; foliis rosulatis erectis vel patentibus pauciusculis graminoideis ad apicem attenuatis glabris multostriatis; pedunculis erectis filiformibus stramineis tricostatis paulo contortis valde patenti-pilosis, senectute glabrescentibus; capitulis hemisphaericis albis dense multifloris.

Annual herb, 14--17 cm. tall; leaves rosulate, erect or spreading, rather few, grass-like, 2--3.5 cm. long, 2--3 mm. wide, attenuate at the apex, several- to many-striate, glabrous; peduncles 5--10 per plant, erect, filiform, stramineous, 10.5--15 cm. long, 3-costate, only very slightly twisted, abundantly spreading-pilose, the hairs wearing off in age; heads hemispheric, 6--8 mm. wide, white, densely many-flowered; involucral bractlets stramineous, obovate, about 3 mm. long and 1 mm. wide, obtuse at the apex, glabrous, shiny; receptacle long-pilose; staminate florets long-pedicellate, the sepals 3, separate, oblong, whitish, about 1.4 mm. long and 0.35 mm. wide, densely white-barbate; petals 3, separate, oblong, whitish, about 1.4 mm. long and 0.35 mm. wide, densely white-barbate; pistillate florets: sepals 3, separate, oblong, hyaline, about 2.8 mm. long and 0.35 mm. wide, acute at the apex, long-ciliate at the apex only,

otherwise glabrous; petals 3, oblong-linear, about 0.7 mm. long and 0.1 mm. wide, densely white-barbate; ovary small, glabrous, about 0.35 mm. long and wide, 3-sulcate, 3-celled, 3-ovulate.

The type of this species was collected by Boismare (no. 386) on wet sandy soil at Toumou, Friguiagbé, Republic of Guinea, on September 13, 1943, and is no. 3904 in the James Chillou herbarium, deposited in the herbarium of the Institut Française d'Afrique Noire at Dakar.

ERIOCAULON HIRSUTULUM Moldenke, Résumé Suppl. 4: 6, nom. nud. 1962; sp. nov.

Herba parva annua; foliis caespitosis graminoideis erecto-patentibus viridibus attenuatis glabris nec fenestratis non striatis; pedunculis erectis gracilibus stramineis dense patenteque sericeo-hirsutulis; vaginis laxiusculis multostriatis glabris; capitulis hemisphaericis stramineis.

Small annual herb, 7--9.5 cm. tall; leaves tufted, grass-like, erect-spreading, 1.3--2.2 cm. long, about 1 mm. wide, green, attenuate at the apex, not plainly striate nor fenestrate, glabrous; peduncles erect, slender, 3--8 per plant, stramineous, 6--9.5 cm. long, densely silky-hirsutulous with wide-spreading whitish hairs; sheaths rather loose, 2--2.3 cm. long, green, many-striate, glabrous, the blade short, erect, plainly apiculate at the apex; heads hemispheric, about 3 mm. wide, stramineous; involucral bractlets oblong, stramineous, about 2.3 mm. long and 1 mm. wide, glabrous, shiny; staminate florets: sepals 3, separate, hyaline or whitish, about 0.7 mm. long and 0.2 mm. wide, narrowly oblong, acute at the apex, glabrous; petals 3, separate, hyaline, about 0.9 mm. long, laciniate, glabrous; stamens 6; pistillate florets long-pedicellate, the sepals 3, separate, oblong, hyaline, about 1.4 mm. long and 0.35 mm. wide, acute and pilose at the apex; petals 3, separate, linear, stramineous, about 1 mm. long and 0.14 mm. wide, laciniate at the apex, glabrous; ovary subglobose, about 0.5 mm. long and wide, glabrous, 3-sulcate, 3-celled, 3-ovulate.

The type of this species was collected by J. G. Adam (no. 18370) at Asamame, Senegal, on October 8, 1961, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

ERIOCAULON LATIFOLIUM f. PROLIFERUM Moldenke, Résumé Suppl. 4: 6, nom. nud. 1962; f. nov.

Haec forma a forma typica speciei capitulis plerumque foliaceo-proliferis recedit.

This form differs from the typical form of the species in having its heads often proliferating into a cluster of leaves 5--20 mm. long.

The type of the form was collected at Lac de Moka, Senegal, on December 9, 1951, and is no. 10358 in the herbarium of the Institute Française d'Afrique Noire at Dakar. This same tendency to vivipary or proliferation is seen in E. brevifolium Klotzsch, E. longifolium Nees, E. modestum Kunth, E. sexangulare L., Paspalan-

thus capillaceus Klotzsch, P. fasciculatus (Rottb.) Körn., and Syngonanthus caulescens (Poir.) Ruhl.

ERIOCAULON SEXANGULARE f. VIVIPARUM Moldenke, Résumé Suppl. 5: 6, nom. nud. 1962; f. nov.

Haec forma a forma typica speciei capitulis plusminusve viviparis recedit.

This form differs from the typical form of the species in having its heads more or less conspicuously viviparous.

The type of the form was collected by Edred John Henry Corner (no. 37693) in mud by a stream at Rengam, Johore, Malaya, on October 22, 1941, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

LIPPIA MCVAUGHI Moldenke, Résumé Suppl. 4: 4, nom. nud. 1962; sp. nov.

Arbor usque ad 12 m. altus; ramulis gracilibus glabris stramineis; foliis ellipticis vel ovatis regulariter serratis utrinque glabris nitidisque; inflorescentiis axillaribus solitariis pedunculatis capitatis; pedunculis filiformibus 1.5--4 cm. longis stramineis glabris; capitulis viridi-albis 1.4--2.5 cm. latis multifloris; bracteis magnis papyraceis ovatis; corollis albis.

Tree, 10--12 m. tall; trunk 25 cm. in diameter at breast height; branchlets slender, gray-stramineous, glabrous, the younger parts obscurely tetragonal; leaves decussate-opposite, numerous toward the tips of the branchlets; petioles very slender, about 1 cm. long, glabrous; leaf-blades thin-chartaceous, shiny-green on both surfaces, elliptic or ovate, 2--6 cm. long, 1--3.5 cm. wide, acute or short-acuminate at the apex, sharply serrate with regular somewhat antrorsely appressed teeth from below the widest part to the apex, cuneate-acuminate at the base, glabrous on both surfaces; midrib very slender, flat above, prominent beneath; secondaries very slender, 5--8 per side, arcuate-ascending, not anastomosing, terminating in the sinuses between the teeth, flat above, prominulous beneath; veinlet reticulation rather sparse and not prominent; inflorescence axillary, near and at the apex of the branchlets, one per axil, opposite and decussate; peduncles filiform, 1.5--4 cm. long, glabrous; heads densely many-flowered, 1.4--2.5 cm. wide; bracts large, ovate, papery, greenish-white, 12--15 mm. long, 6--8 mm. wide at the base, acute at the apex, sessile, densely short-pubescent on both surfaces; corolla white, yellow in the center.

The type of this species was collected by Rogers McVaugh and Walter Norman Koelz (no. 1660) on low mountain summits 7 miles north of Santiago, on the road to Durazno, in deciduous woodlands, growing with Cordia, Brosimum, and Platymiscium, at an elevation of 200 meters, Colima, Mexico, on December 10, 1959, and is deposited in the herbarium of the University of Michigan at Ann Arbor, Michigan. The collectors note that it was abundant at the type locality. It is a pleasure to name this fine plant in honor of my good friend, Rogers McVaugh, who has done such noteworthy work on the taxonomy of vascular plants, especiall of the Lobeliaceae.

MESANTHEMUM CHILLOUI Moldenke, Résumé Suppl. 4: 6, nom. nud. 1962; sp. nov.

Herba parva annua; foliis rosulatis patentibus membranaceis vel pellucidis apiculatis glabris nitidis; pedunculis nonnullis stramineis filiformibus 4-costatis glabris contortis erectis; vaginis laxiusculis glabris nitidis; capitulis hemisphaericis albis multifloris; bracteis involucri ellipticis stramineis.

Diminutive herb, apparently annual, 3—8 cm. tall; leaves basal, tufted, spreading, membranous or pellucid, 5—9 mm. long, less than 1 mm. wide, apiculate at the apex, glabrous, shiny; peduncles several per plant, stramineous, filiform, 3—7 cm. long, 4-costate, glabrous, twisted, erect; sheaths rather loose, 1—1.5 cm. long, glabrous, shiny, the apical blade lanceolate, about 2 mm. long, apiculate; heads hemispheric, white, 5—7 mm. wide, many-flowered; involucral bractlets elliptic, about 2.1 mm. long and 1 mm. wide, stramineous, obtuse at the apex, glabrous; receptacle glabrous; staminate florets: sepals 3, linear, separate, hyaline, about 1.4 mm. long and 0.17 mm. wide, glabrous; petals 3, connate at the base into a narrow tube, the lobes white, unequal, lingulate, one about 1 mm. long and 0.7 mm. wide, the other two about 0.7 mm. long and 0.35 mm. wide, densely white-pubescent; stamens 6; pistillate florets: sepals 3, linear, hyaline, about 1.4 mm. long and 0.14 mm. wide, separate, glabrous; petals 3, separate, linear, about 1.4 mm. long and 0.14 mm. wide, glabrous.

The type of this distinctive species was collected by James Chillou (no. 716) -- in whose honor it is named -- on inundated sandstone on the plantation of Mayon-Couré, Friguiagbé, Republic of Guinea, on September 25, 1938, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York. The collector notes that this is one of the first plants to push up on to the inundated bare sandstone substratum after birning of underbrush, forming tufts with many inflorescences.

MESANTHEMUM NECOPINATUM Moldenke, Résumé Suppl. 4: 6, nom. nud. 1962; sp. nov.

Herba parvissima annua; foliis paucis caespitosis ut videtur ephemeris filiformibus pellucidis glabris attenuatis; pedunculis numerosis erectis stramineis 4-angulatis paulo contortis glabris nitidis; vaginis arcte appressis fenestratis viridibus glabris, lamina lanceolata erecta appressa subpellucida attenuata; capitulis cupuliformibus supra albis; bracteis involucri nigris late ellipticis glabris nitidis ad apicem rotundatis.

Very small annual herb, 3—5 cm. tall; leaves few, tufted, apparently ephemeral, filiform, pellucid, 1—2 cm. long, less than 1 mm. wide, glabrous, attenuate to the apex; peduncles numerous, erect, stramineous, 3—5 cm. long, 4-angled, somewhat twisted, glabrous, shiny; sheaths loosely appressed, about 1.5 cm. long, fenestrate, green, glabrous, the blade lanceolate, erect, appressed, subpellucid, attenuate at the apex; heads cupuliform, about 4 mm. wide, white from above; involucral bractlets

black, broadly elliptic, about 1.7 mm. long and 1 mm. wide, rounded at the apex, glabrous, shiny; staminate florets: sepals 3, separate, hyaline, linear, about 1 mm. long and 0.1 mm. wide, glabrous; petals 3, connate into a tube about 1.4 mm. long, the free lobes obovate-lingulate and densely white pilose-barbate, two about 0.7 mm. long and 0.5 mm. wide, the third about 1.4 mm. long and 1.2 mm. wide, rounded at the apex; stamens 6; anthers black; pistillate florets: sepals 3, separate, black toward the apex, two carinate on the back, about 1.4 mm. long and 0.5 mm. wide, glabrous, the third obovate, cucullate-concave, about 1.6 mm. long and 1 mm. wide, short-barbate with white hairs at the apex on the back; petals 3, separate, two oblanceolate, about 1.4 mm. long and 0.35 mm. wide, antrorsely white-pilose at the apex on the back, pale-gray, the third about 2.4 mm. long, lingulately expanded at the apex and 0.7 mm. wide, densely white-barbate; ovary subglobose, about 0.5 mm. long and wide, glabrous, 3-sulcate, 3-celled, 3-ovulate; style filiform, about 1.4 mm. long, glabrous.

The type of this species was collected by James Chillou (no. 846) on inundated sandstone on the plantation of Mayon-Couré, Friguiagbé, Republic of Guinea, and is deposited in the herbarium of the Institute Française d'Afrique Noire at Dakar.

MESANTHEMUM RUBRUM Moldenke, Résumé Suppl. 4: 6, nom. nud. 1962; sp. nov.

Herba elegans annua; foliis parciusculis caespitosis erectis graminoideis breviter apiculatis utrinque plusminusve patenti-pubescentibus nec striatis non fenestratis; pedunculis gracillimis erectis numerosis aureo-stramineis plusminusve dense pubescentibus vel hirsutulis perobscure bisulcatis vel subteretibus; vaginis arctiuscule adpressis vel paulo laxis obscure striatis paulo contortis dense fulvo-hirsutulis; capitulis primo obconicis, demum hemisphaericis valde rubris.

Elegant apparently annual herb, to 30 cm. tall; leaves rather few, tufted, erect, grass-like, 2.5—3 cm. long, 2—3 mm. wide, short-apiculate at the apex, more or less spreading-pubescent on both surfaces, not striate nor fenestrate; peduncles very slender, erect, 2—6 per plant, 13—30 cm. long, golden-stramineous, more or less densely pubescent or hirsutulous, very obscurely 2-sulcate or subterete; sheaths rather closely appressed or somewhat loose, surpassing the leaves, 5—6 cm. long, obscurely striate, slightly twisted, densely hirsutulous with fulvous hairs, the apical limb ovate, erect, acute at the apex; heads obconic when young, later hemispheric, decidedly red during anthesis; involucral bractlets firm, ovate, dark-brown, about 3 mm. long and 1.5 mm. wide, acute at the apex, with broad lighter margins, densely long-pilose with antrorse hairs on the back; receptacle long-pilose; receptacular bractlets oblong, about 3 mm. long and 0.35 mm. wide, dark-brown toward the apex, barbate with red hairs on the back at the apex; staminate florets: sepals reduced to hairs; petals 3, connate into a filiform tube about 1.4 mm. long, the free lobes lingulate, red, about 0.72 mm. long and 0.35 mm. wide, densely red-barbate; stamens 6; anthers yellow; pistillate florets: sepals apparently

reduced to long hairs, some 2.4 mm. long and surmounted by a magnificent red plume 3--3.5 mm. long; petals 3, connate into a filiform hyaline tube about 1.9 mm. long, surmounted by 3 lingulate red lobes about 0.7 mm. long and 0.35 mm. wide, densely barbate-fringed; ovary globose, about 0.5 mm. long and wide, glabrous, 3-sulcate, 3-celled, 3-ovulate; style filiform, about 0.7 mm. long, glabrous; stigmas 3, minute, erect, papillose or finger-like.

The type of this amazing and beautiful species was collected by James Chillou (no. 1835) on very wet sandstone at the plantation of Mayon-Couré, Friguiagbé, in the valley of Quatamba, Republic of Guinea, on February 10, 1940, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York. The floral morphology of this plant is not clear. Some flower-heads seem to have only a single red plume; others have 2, 3, or more. Whether these are appendages to the receptacular bractlets or to the sepals is not clear. Almost certainly a new genus is here indicated.

PAEPALANTHUS BELLUS Moldenke, Résumé Suppl. 4: 5, nom. nud. 1962; sp. nov.

Herba parva caulescens; caulibus brevibus gracillimis foliosis adscendentibus vel erectis; foliis uniformibus linearibus opacis costatis obtusiusculis versus basin ad marginibus longe pilosis, caeterem glabris; pedunculis filiformibus tricostatis glabris stramineis; vaginis arcte adpressis glabris; capitulis hemisphaericis albidis; bracteis involucri obovatis brunneis.

Small caulescent herb, to about 10 cm. tall; stems short, very slender, leafy, 1--2.5 cm. long, ascending or erect; leaves quite uniform, linear, 1—1.5 cm. long, less than 1 mm. wide, opaque, several-ribbed, rather blunt at the apex, long-pilose on the margins toward the base, otherwise glabrous; peduncles filiform, 4—9 cm. long, 3-costate, glabrous, stramineous; sheaths closely appressed, shorter than the leaves, glabrous, the apical blade rounded or bilobed; heads hemispheric, about 3 mm. wide, whitish; involucral bractlets obovate, dark-brown, about 1.7 mm. long and 0.8 mm. wide, glabrous; receptacle long-pilose; receptacular bractlets oblong, dark-brown, about 1.5 mm. long and 0.5 mm. wide, white-barbate at the apex on the back, otherwise glabrous; staminate florets: sepals 3, separate, obovate, dark-brown, acute at the apex, white-barbate at the apex on the back; petals 3, connate into a hyaline tube about 1.4 mm. long, glabrous; stamens 3; pistillate florets: sepals 3, separate, obovate, dark-brown, acute at the apex, white-barbate on the back at the apex; petals 3, oblong, hyaline, about 1 mm. long, antrorsely long-pilose; ovary subglobose, stramineous, about 0.7 mm. long and wide, glabrous, 3-sulcate, 3-celled, 3-ovulate; style about 0.2 mm. long.

The type of this species was collected by Gert Hatschbach (no. 7391) at Rio Coutinho, municipality of Guarapuava, Paraná, Brazil, on October 21, 1960, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

PAEPALANTHUS DIFFISSUS Moldenke, Résumé Suppl. 4: 5, nom. nud. 1962; sp. nov.

Herba; foliis dense rosulatis adscendentibus 6—10 cm. longis, ad basin usque ad 1 cm. latis, supra leviter subtus densissime villosis; pedunculis 12—15 cm. longis erectis complanatis multistriatis minute puberulis versus apicem fissis; capitulis 1—3 per diviso pedunculorum.

Herb; stems apparently thick but abbreviated, very densely leafy; leaves densely cespitose, erect or ascending, 6—10 cm. long, lanceolate, to 1 cm. wide at the base, uniformly tapering to the mucronulate apex, sparsely villosulous above, very densely sordid-villous beneath; peduncles 2—6, erect, 12—15 cm. long, flat, many-sulcate, very minutely puberulous, divided toward the apex into 2—4 divisions of equal or very unequal length, each terminated by a head of flowers; individual flower-heads more or less obconic or hemispheric, 4—9 mm. wide, gray; involucral bractlets numerous, closely imbricate, ovate-lanceolate or triangular-ovate, 2.5—3 mm. long, 1—2 mm. wide, abruptly acuminate from the broad base, ciliolate along the margins, otherwise glabrous and shiny; receptacle long-pilose; receptacular bractlets broadly elliptic, dark-brown, about 2.4 mm. long and 1 mm. wide, acute at the apex, white-barbate on the back at the apex; staminate florets: sepals 3, dark-brown, separate, oblanceolate or obovate, 1.9—2.4 mm. long, 0.8—1.4 mm. wide, acute or very short-acuminate at the apex, densely white-barbate on the back at the apex; petals 3, hyaline, forming a tube about 1.7 mm. long; stamens 3, included; pistillate florets not seen.

The type of this species was collected by Vareschi (no. 5357) in Espeletieta graminosa, at 3200—3600 meters altitude, Po. El Batallon, Táchira, Venezuela, on October 3, 1956, and is deposited in the Herbario Nacional de Venezuela at Caracas.

PAEPALANTHUS MUSCOSUS var. TACHIRENSIS Moldenke, Résumé Suppl. 4: 5, nom. mud. 1962; var. nov.

Haec varietas a forma typica speciei pedunculis usque ad 12 cm. longis, caulibus usque ad 13 cm. longis, et foliis usque ad 1.7 cm. longis recedit.

This variety differs from the typical form of the species in having its peduncles to 12 cm. long, the stems to 13 cm. long, and the leaves to 1.7 cm. long.

The type of the variety was collected by Vareschi in Espeletieta graminosa, at an altitude of 3100 meters, at Po. El Batallon, Táchira, Venezuela, on March 10, 1956, and is deposited in the Herbario Nacional de Venezuela at Caracas.

PAEPALANTHUS POLYTRICHOIDES var. DENSUS Moldenke, Résumé Suppl. 5: 5. 1962; var. nov.

Haec varietas a forma typica speciei foliis densissimis arcte adpressis imbricatisque recedit.

This variety differs from the typical form of the species in having its leaves extremely dense, very closely appressed, and tightly overlapping during anthesis.

The type of this variety was collected by José Cuatrecasas Arumi and Roberto Jaramillo Mejía (no. 25737) around the Laguna de Chisacá, at an altitude of 3650 to 3700 meters, on the Páramo de Chisacá, Macizo de Bogotá, Cundinamarca, Colombia, on December 29, 1959, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

PREMNA TAITENSIS var. VITIENSIS Moldenke, Résumé Suppl. 4: 9 and 5: 6, nom. nud. 1962; var. nov.

Haec varietas a forma typica speciei venis primariis foliorum laminorum subtus plusminusve barbato-hispidulis recedit.

This variety differs from the typical form of the species in having its leaf-blades more or less barbate along the midrib and sometimes also along the secondaries beneath. It differs from var. rimatarensis F. H. Br. in having the leaf-blades averaging narrower, usually more ovate in outline, and usually more tapering at the apex in attenuate-acute or subacuminate fashion. In var. rimatarensis the leaf-blades are usually more subrotund or oblong in shape, usually abruptly acute or obtuse in submucronate fashion at the apex in the style of P. obtusifolia R. Br.

The type of the variety was collected by Albert Charles Smith (no. 7029) at the edge of a forest, at an altitude of 100 to 200 meters, in the vicinity of Ndakuivuna, in the hills east of the Eainimbuka River, Tailevu, Viti Levu, Fiji Islands, between April 14 and 26, 1953, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

It seems probable that Brown's var. marchionica, var. rapensis, and var. rimatarensis are actually varieties of P. mariannarum Schau., and also that P. gaudichaudii Schau. is merely a luxuriant variety or form of P. obtusifolia. However, not having as yet seen the actual types of P. taitensis, P. mariannarum, or P. gaudichaudii, I hesitate to make the transfers at this time. It is also not at all clear to me why P. integrifolia L. should not be retained as the valid name for what is now passing as P. obtusifolia. The P. Nelson collections distributed and annotated by E. D. Merrill as "TOPOTYPE, typical of Premna gaudichaudii Schauer" seem to be typical P. mariannarum.

SPHENODESME SMITINANDI Moldenke, Résumé Suppl. 5: 6, nom. nud. 1962; sp. nov.

Frutex scandens; ramis subtetragonis glabris; ramulis puberulentis; nodis annulatis; foliis decussatis; petiolis gracilibus 6—9 mm. longis strigilloso-puberulentibus; laminis chartaceis ellipticis 7.5—10.5 cm. longis 1.5—3.5 cm. latis, ad apicem acutis vel acuminatis, integris, ad basin rotundatis, supra sparsissime strigillosis vel glabrescentibus nitidis, subtus dense pubescentibus; inflorescentiis terminalibus paniculatis; bracteis involucri 6 oblanceolatis usque ad 18 mm. longis et 6 mm. latis utrinque strigillosis; corollis caeruleis.

Woody climber; stems subtetragonal, gray, glabrous; branchlets

slender, subtetragonal, densely brown-puberulent; nodes annulate; principal internodes 2.5--7 cm. long; leaves decussate-opposite; petioles slender, 6--9 mm. long, strigillose-puberulent with antrorse hairs; leaf-blades chartaceous, dark-green above, lighter beneath, elliptic, 7.5--10.5 cm. long, 1.5--3.5 cm. wide, acute or acuminate at the apex, entire, rounded at the base, very sparsely strigillose or glabrescent above, densely brown-pubescent beneath; midrib slender, flat above, prominulous beneath; secondaries slender, about 3 per side, ascending, flat above, slightly prominulous beneath; veinlet reticulation abundant, forming a rather conspicuous network; inflorescence terminal on the branchlets, paniculate, and also a few small cymes in the axils of the uppermost leaves; panicle about 23 cm. long and 12 cm. wide; cymes pedunculate, about 5 cm. long and 3 cm. wide; sympodia tetragonal, slender, densely brownish-strigillose; peduncles very slender, about 1.5 cm. long, brown-strigillose; sympodia 1--3 cm. long; involucral bracts 6, oblanceolate, to 18 mm. long and 6 mm. wide during anthesis, densely strigillose on both surfaces, rounded at the apex; calyx cupuliform, about 4 mm. long and wide, densely canescent-puberulent, the rim conspicuously lobed; corolla blue.

The type of this species was collected by my good friend and colleague, Tem Smitinand (no. 4852) — in whose honor it is named — scattered in an old clearing at Rachasima, Pak Chawng, at an altitude of about 200 meters, in eastern Thailand, on September 4, 1958, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York.

STACHYTARPHETA INCANA var. JALISCANA Moldenke, Résumé Suppl. 4: 4, nom. nud. 1962; var. nov.

Haec varietas a forma typica speciei bracteolis angustissime lineari-lanceolatis et corollis albis recedit.

This variety differs from the typical form of the species in having its bractlets very narrowly linear-lanceolate, except for the very base almost filiform, and the corollas white.

The type of the variety was collected by Rogers McVaugh (no. 19919), who says that it was locally abundant in wooded ravines in the mountains north of Autlán, 3--5 miles above Mina San Francisco (Cia. Minera de Autlán), in the tropical deciduous forest zone with Bursera, Ceiba, Ipomoea, and Triumfetta, at 1500—1650 meters altitude, Jalisco, Mexico, collected on October 5, 1960, and deposited in the herbarium of the University of Michigan at Ann Arbor. The collector notes that it is a shrub 1.5 m. tall.

SYNGONANTHUS PULVINELLUS Moldenke, sp. nov.

Herba parvissima acaulescens; foliis rosulatis linearibus glabris nitidis apiculatis, ad basin densissime albo-lanato-pulvinellis; vaginis arcte adpressis griseis tenuiter membranaceis multistriatis paulo contortis glabris; pedunculis solitariis gracillimis erectis laxe longeque pilosis tricostatis paulo contortis; capitulis subglobosis griseis; bracteis involucri membranaceis lanceolatis aristatis.

Dwarf acaulescent herb, forming tufts; leaves rosulate, linear, 1—2 mm. long, glabrous, shiny, apiculate at the apex, with a very dense and conspicuous cushion of white wool at the center of the rosette; sheath closely appressed, 5—7 mm. long, gray, thin-membranous, many-striate, slightly twisted, glabrous, its rim oblique, not at all spreading, somewhat laciniate, not pilose; peduncles solitary, 2.5—3 cm. long, erect, very slender or filiform, loosely long-pilose, 3-angled, slightly twisted; heads solitary, subglobose, 3—4 mm. long and wide, gray; involucral bractlets membranous or subhyaline, lanceolate, about 1 mm. long, aristate at the apex, broadly white-margined, with a dark central midrib leading into the apical point, glabrous on both surfaces; receptacle pilose.

The type of this very distinct and unmistakable species was collected by Bassett Maguire, Geraldo Mendes Magalhães, and Celia K. Maguire (no. 49183), occasional on sandstone on the road between Diamantina and Gouveia, Minas Gerais, Brazil, on August 12, 1960, and is deposited in the Britton Herbarium at the New York Botanical Garden.

SYNGONANTHUS XERANTHEMOIDES var. GRAHAMAE Moldenke, var. nov.

Haec varietas a forma typica speciei foliis tenuiter chartaceis submembranaceis flaccidis 5—9 cm. longis 0.5—2 mm. latis ad apicem attenuatis recedit.

This variety differs from the typical form of the species in having its leaves during anthesis thin-chartaceous or submembranous, flaccid, 5—9 cm. long, 0.5—2 mm. wide, and gradually narrowed to the attenuate apex.

The type of the variety was collected by V. Graham (no. 154) — in whose honor it is named — on brown sand at the Mahdia goldfield, Potaro River, British Guiana, on July 31, 1958, and is deposited in the herbarium of the Royal Botanic Gardens at Kew.

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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. VII

Harold N. Moldenke

VERBENA L.

Additional and emended bibliography: Leche, Kongl. Swensk. Wetensk. Acad. Handl. 5: 262. 1744; J. A. Murr., Prod. Desig. Stirp. Gotting. 40. 1770; C. Murr., Brit. Gard. 2: 478—480. 1799; Spreng. in L., Syst. Veg., ed. 16, 2: 749 & 750. 1825; Lindl. in Edwards, Bot. Reg. 13: pl. 1102 (1827) and 14: pl. 1184. 1828; Reider, Ann. Blumisterei 7: 288—289, 291, & 295, [pl. 24]. 1831; J. Harrison, Floricult. Cab. 6: 47. 1838; Maund & Henslow, Botanist 2: pl. 60 (1838) and 3: pl. 129. 1839; Gard. Chron. 1841: 730. 1841; Gren. & Godr., Fl. Franç. 2: 718. 1852; Strobl, Flora van Admont, Programme des Melker Gymnasium. 1882; F. Muell., Syst. Cens. Aust. Pl. 102.

1882; J. Ball, Notes Naturalist 293. 1887; F. M. Bailey, Cat. Indig. Nat. Pl. Queensl. 35. 1890; Murr, Deutsch. Bot. Monatschr. 20: 52. 1902; L. H. Bailey, Cycl. Amer. Hort., ed. 1, 6: 1912--1916, pl. 2649 (1902) and ed. 4, 6: 1912--1916, pl. 2649. 1906; Fedde in Just, Bot. Jahresber. 33 (1): 632--633. 1906; E. H. L. Krause in Sturm, Fl. Deutschl. 15: 305. 1907; Murr, Allg. Bot. Zeitschr. 14: 19 (1908) and 16: 187. 1910; Druce, Rep. Bot. Exch. Club Brit. Isles 1913 (3): 425. 1914; L. H. Bailey, Stand. Cycl. Hort. 6: 3445—3447, pl. 3910. 1917; Molfino, Physis 7: 103. 1923; Britton & P. Wils., Scient. Surv. Porto Rico 6: 137, 138, 140, & 142—144. 1925; Larrañ., Atlas Bot. pl. 42. 1927; Gonzalez, Copp., & Lomb., Pl. Diaph. Fl. Urug. 1: 9 & 29—30. 1928; H. F. Roberts, Pl. Hybrid. before Mendel 24--28, pl. 17 & 18. 1929; Herter, Estud. Bot. Reg. Urug. 8b: 160, 170, & 201. 1933; Parodi, Rev. Argent. Agron. 1: 202. 1934; T. Meyer, Memor. Comis. Invest. Lang. Correspond. 1934: 154. 1934; Gard. Chron., ser. 3, 101: 423. 1937; Florists Exch. 89 (3): 45. 1937; M. R. Espinosa Bustos, Rivadavia 327. 1938; N. Y. Times, March 12. 1939; Beale, Chron. Bot. 5: 517. 1939; Balls, Gard. Chron. Amer. 45: 36. 1941; Descole, Gen. & Sp. Pl. Argent. 2: Icon. Pl. Argent. pl. 165. 1944; Cabrera, DAGI Pub. Tec. 3: 27, 38, 45, & 75. 1945; Deam, Kriebel, Yuncker, & Friesner, Proc. Ind. Acad. Sci. 55: 56. 1946; Martinez Crovetto & Piccinini, Revist. Investig. Agric. 4: 178, 180, 225, & 226. 1950; Politi, The Garden 2 (4): 22. 1950; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2208--2213. 1951; Lombardo, Invent. Pl. Cult. Montevideo 222, 232, 248, & 262. 1954; Free, All About Peren. Gard. 116 & 352. 1955; Rambo, Sellowia 7: 260 & 288. 1956; Soukup, Biota 1: 180--181. 1956; J. & L. Bush-Brown, Am. Gard. Book, new rev. ed., 315, 327, & 383. 1958; Kunkel, Ber. Schweiz. Bot. Gesell. 71: 177. 1961; Lombardo, Arbust. & Arbustill. Pas. Publ. 255. 1961; Assoc. Etud. Tax. Fl. Afr. Trop. Index 1961: 60. 1962; McCabe, Our Parks 28 (1): 1. 1962; H. N. Moldenke, Résumé Suppl. 4: 1--21 (1962) and 5: 1—8. 1962; Pearce Seeds & Plants, Our Am. Wild Fls. 10. 1962.

An additional named hybrid is

Verbena mendocina R. A. Phil. x V. parodii (Covas & Schnack) Moldenke = xV. perturbata Moldenke

An additional unidentified name is

Verbena peruana, quae hispanicae similis, ex Monardi, Lugdenensis referet C. Bauh., Pinax Theatr. Bot., ed. 1, 269. 1623.

It is of interest to note that "Verbena" is now being used as the name of a color (of blankets offered by John Wanamaker, Philadelphia, in 1962). The Waterfall & Wallis 13476, distributed as a species of Verbena, is actually Priva grandiflora (Ort.) Moldenke.

VERBENA ABRAMSI Moldenke

Additional bibliography: Moldenke, Résumé Suppl. 4: 4. 1962.

The Wilkes 1661 collection cited below is a mixture with V. lasiostachys var. septentrionalis Moldenke.

Additional citations: CALIFORNIA: Kings Co.: Kearney 56 (W—

410850). Los Angeles Co.: Abrams & McGregor 689 (W—613394); Braunton 520 (W—465502). Monterey Co.: G. R. Vasey s.n. [San Antonio River, 1880] (W—56224). San Bernardino Co.: Parish & Parish 969 (W—771849). County undetermined: Wilkes 1661, in part [Lower Sacramento] (W—71925).

VERBENA ALATA Sweet

Additional and emended bibliography: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2208—2210. 1951; Rambo, Sellowia 7: 260 & 288. 1956.

Additional citations: BRAZIL: Minas Gerais: Henschen I.326 [Caldas, 1855] (W—209643); Regnell I.326 [Caldas, 8/2/1865] (W—1323099).

VERBENA AMBROSIFOLIA Rydb.

Additional synonymy: Verbena ambrosifolius Rydb., in herb.

Additional bibliography: Moldenke, Résumé Suppl. 5: 4. 1962.

Specimens of this species have also been misidentified and distributed in herbaria as V. ciliata var. pubera (Greene) Perry, V. hastata L., and V. pinnatifida Lam. The Wooton 642 cited below was identified originally as "V. bipinnatifida x wrightii". The A. H. Howell 159.1 cited below is a mixture with V. bracteata Lag. & Rodr. The Mearns 2677, also cited below, is annotated by Perry as "atypical", while Kearney says of it "why not V. gooddingii?" Moore & Steyermark 3622 is annotated by Perry as V. bipinnatifida var. latilobata Perry. In the United States National Herbarium she has annotated O. B. Metcalfe 1231 and Wooton s.n. [Ojo Caliente, July 18, 1904] as V. ambrosifolia, but I see no glands on them, so I am regarding them as f. eglandulosa Perry. The Clawson 13923 and O. B. Metcalfe 1090 annotated by her as V. wrightii A. Gray and so cited by her (1933) are V. ambrosifolia, at least insofar as the United States National Herbarium specimens are concerned, as is also O. B. Metcalfe 126. The Wooton 364 cited by her and by me as V. wrightii may be a mixture, because the United States National Herbarium and Britton Herbarium specimens are definitely V. ambrosifolia.

The Demaree 12451 & 12451a, Geyer 107, A. Nelson 8245, and Rose & Painter 6427, distributed as V. ambrosifolia in the United States National Herbarium, are all V. bipinnatifida Nutt.; G. L. Fisher 319, Shreve 8797, and Wynd & Mueller 450 are V. ciliata Benth.; E. W. Nelson 4424 & s.n. [May 1898] are V. delticola Small; F. M. Chamberlain 56 is V. gooddingii Briq.; and J. G. Ortega 4541 is V. gooddingii var. nepetifolia Tidestr., while the Eggleston 10737, annotated by Perry as V. ambrosifolia, is actually V. bipinnatifida var. latilobata Perry.

The Kellogg specimen cited below was originally distributed as

V. tenera Spreng. The C. Thomas s.n. [Colorado Terr., 1869] collection is a mixture with V. bracteata Lag. & Rodr. The sheet of E. W. Nelson 6189 in the United States National Herbarium bears this number on a tag attached to the plant and also on the label, but someone has changed it on the label to read "6789".

V. ambrosifolia has been collected on sandy loam bottoms and in fertile alluvial soil of the coastal plain in Mexico.

Additional citations: COLORADO: Denver Co.: J. M. Coulter s.n. [Denver, May 17, 1873] (W—255748); Eastwood 140 (W—582388). Fremont Co.: J. H. Cowen s.n. [Florence, June 14, 1892] (W—216752); Tweedy 102 (W—257534). Huerfano Co.: Shear 4760 (W—858387). Las Animas Co.: C. M. Rogers 4556 (W—2053271), 6126 (W—2053611). Otero Co.: Rose & Fitch 17504 (W—760580). County undetermined: J. H. Cowen 403 [Foothills] (W—254917); C. Thomas s.n. [Colorado Terr., 1869] (W—71930). TEXAS: Bexar Co.: Havard s.n. [San Antonio] (W—155939). Brewster Co.: A. R. Moldenke 171 (Fg); Sperry T.126 (W—1679249). Culberson Co.: Moore & Steyermark 3622 (W—1566713). Dallam Co.: A. H. Howell 140 (W—500265). Hudspeth Co.: A. R. Moldenke 162 (Fg), 163 (Fg), 164 (Fg, Z). Jeff Davis Co.: A. R. Moldenke 165 (Fg, Z, Z). Presidio Co.: A. R. Moldenke 167 (Fg, Z). Ward Co.: Clawson 13923 (W—1085078). NEW MEXICO: Bernalillo Co.: Harward 9 (W—370690), 14 (W—370695); Rose & Fitch 17801 (W—760880). Chaves Co.: Earle & Earle 322 (W—382474); Griffiths 4244 (W—496289). Colfax Co.: Griffiths 5515 (W—496705). Dona Ana Co.: A. R. Moldenke 132 (Fg); Wooton 642 (W—330781). Eddy Co.: P. C. Standley 40334 (W—1221731); Wooton s.n. [Queen, Aug. 2, 1909] (W—736222). Grant Co.: O. B. Metcalfe 126 (W—495243). Lincoln Co.: A. R. Moldenke 130 (Fg, Z); Wooton 363 (W—330588), 364 (N, W—330589); Wooton & Standley 3635 (W—562150), 3691 (W—561431). Otero Co.: Wooton s.n. [Hess Ranch, Aug. 4, 1909] (W—564652). Quay Co.: G. L. Fisher 89 (W—660028); A. R. Moldenke 123 (Fg). Rio Arriba Co.: Eggleston 5957 (W—857727), 6491 (W—660685), 6644 (W—660857). San Miguel Co.: V. Bailey 529 (W—443640), 536 (W—443647); P. C. Standley 4951 (W—498973). Santa Fe Co.: Wooton 2832 (W—736882), 2833 (W—736881), s.n. [Glorieta, Aug. 24, 1910] (W—736885). Sierra Co.: O. B. Metcalfe 1090 (W—498278). Socorro Co.: C. L. Herrick 513 (W—737261); G. R. Vasey s.n. [Socorro, May 1881] (W—155940), s.n. [Socorro, 1881] (W). Torrance Co.: G. L. Fisher 18 (W—562733); A. R. Moldenke 128 (Fg). Union Co.: A. H. Howell 159.1, in part (W—495047); P. C. Standley 6087 (W—685123). County undetermined: Fendler 586 (W). ARIZONA: Apache Co.: Peebles & Smith 13972 (W—1732898). Coconino Co.: Edw. Palmer s.n. [Little Colorado, 1869] (W—56179). Navajo Co.: L. F. Ward s.n. [Two miles south of Hol-

brook, June 17, 1901] (W—410320), s.n. [Woodruff, June 20, 1901] (W—410319); Zuck s.n. [Holbrook, Aug. 10, 1896] (W—664466), s.n. [Holbrook, Aug. 16, 1896] (W—664465), s.n. [Taylor, Aug. 1, 1897] (W—349023), s.n. [Holbrook, Oct. 9, 1897] (W—664464). Pima Co.: Mearns 2677 (W—234446). MEXICO: Chihuahua: H. S. Gentry 7998 (W—1978779). Coahuila: E. W. Nelson 6189 (W—347415); Pringle 13157 (W—461754); Wynd & Mueller 572 (W—1639970). Nuevo León: Heard, Webster, & Barkley 14512 (W—2134281); Edw. Palmer 1050 (W—1323139). San Luis Potosí: C. L. Lundell 5590 (W—1638806). Sonora: H. S. Gentry 7971 (W—1978765). CULTIVATED: Missouri: J. H. Kellogg s.n. [Mo. Bot. Gard., Aug. 25, 1911] (W—1325356).

VERBENA AMBROSIFOLIA f. EGLANDULOSA Perry

Additional bibliography: Moldenke, Résumé Suppl. 5: 4. 1962.

Humphrey found this plant in yellow pine forests.

Additional citations: TEXAS: Deaf Smith Co.: A. R. Moldenke 120 (Fg). El Paso Co.: F. Wagner 974 (W—228855). NEW MEXICO: Dona Ana Co.: A. R. Moldenke 133 (Fg); P. C. Standley s.n. [mesa just west of Organ Mts., June 13, 1906] (W—560976); Wooton s.n. [Organ, July 14, 1897] (W—736884). Grant Co.: Holzinger s.n. [Santa Rita, Aug. 1, 1911] (W—660557); Mearns 2278 (W—233966). Hidalgo Co.: Mearns 2486 (W—234697); A. R. Moldenke 143 (Fg), 144 (Am, Fg). Sierra Co.: O. B. Metcalfe 1231 (W—498301); A. R. Moldenke 159 (Z). Socorro Co.: A. R. Moldenke 158 (Fg, Z, Z); Wooton 2835 (W—736933). ARIZONA: Cochise Co.: J. I. Carlson s.n. [Douglas, May 13, 1915] (W—873379, W—882856); Cazier s.n. [6 mi. E. Portal, Aug. 27, 1955] (Am); Herb. Arizona State Coll. s.n. [near Southwestern Research Station, 4 May '57] (Am); Herb. Chiricahua Veg.-Study Team 1958-118 (Am), 1959-30 (Am); A. R. Moldenke 134 (Fg, Z, Z), 136 (Am, Fg), 139 (Am), 140 (Am). Greenlee Co.: R. R. Humphrey s.n. [9/2/34] (W—1697813). Pima Co.: Toumey s.n. [Santa Catalina Mts., Sept. 15, 1896] (W—619184), s.n. [Santa Catalina Mts., Sept. 20, 1896] (W—441757). Yavapai Co.: Fulton 9672 (W—1624378). County undetermined: Edw. Palmer s.n. [Arizona, 1869] (W—56218). MEXICO: Sonora: Mearns 1138 (W—229408).

Material of this form has also been misidentified and distributed in herbaria as V. bracteata Lag. & Rodr., V. ciliata var. pubera (Greene) Perry, and V. gooddingii Briq. The O. B. Metcalfe 1231 and Wooton s.n. [Ojo Caliente, July 18, 1904] were regarded by Perry and annotated by her as V. ambrosifolia Rydb., but I see no glands and so I regard them as f. eglandulosa. Of Toumey s.n. [Santa Catalina Mts., Sept. 20, 1896], Edw. Palmer s.n. [Arizona, 1869], and one sheet of J. I. Carlson s.n. [Doug-

las, May 13, 1915] in the United States National Herbarium Kearney says "Why not V. bipinnatifida? Bracts equalling or nearly equalling the calyx", while of Toumey s.n. [Santa Catalina Mts., Sept. 15, 1896] he says "V. bipinnatifida. Bracts nearly equalling calyx. Appr[oaches] V. ciliata in other characters." Of another sheet of J. I. Carlson s.n. [Douglas, May 13, 1915] he says "V. ciliata? glandular pubescence!", but I fail to see the glands; of R. R. Humphrey s.n. [9/2/34] he says "V. bipinnatifida?" I regard all these specimens as f. eglandulosa.

The F. Wagner 974 cited above from El Paso County, Texas, may not actually have come from that county, as its label is inscribed "El Paso to Monument 53".

VERBENA AMOENA Paxt.

Additional citations: MEXICO: México: Pringle 13434 (W--462365).

VERBENA ANDALGALENSIS Moldenke

Additional bibliography: Moldenke, Alph. List Cit. 2: 599. 1948.

The Jürgensen 1613 collection is incorrectly cited by me in my 1938 publication as V. dissecta Willd.

Additional citations: ARGENTINA: Catamarca: Jürgensen 1613 (W--922058--isotype).

VERBENA ANDRIEUXII Schau.

This species has been collected at altitudes of 5200 to 6800 feet, flowering and fruiting in October.

Additional citations: MEXICO: Oaxaca: E. W. Nelson 1513 (W--566002).

VERBENA ARISTIGERA S. Moore

Herbarium material of this species has been misidentified and distributed as V. erinoides L. and as V. multifida Ruíz & Pav.

Additional citations: ARGENTINA: Chaco: Venturi 9780 (W--1591421). Entre Ríos: Lorentz 1053 (W--1233656). CULTIVATED: Germany: Herb. Mus. Bot. Berol. s.n. [1840] (W--546086).

VERBENA ATACAMENSIS Reiche

Additional citations: CHILE: Antofagasta: Werdermann 789 (W--1474301).

VERBENA AURANTIACA Speg.

Additional citations: ARGENTINA: Neuquen: Senn 4326 (W--203433).

xVERBENA BAILEYANA Moldenke

Additional bibliography: H. E. Richter, Cod. Bot. Linn. 35. 1835; H. F. Roberts, Plant Hybrid. before Mendel 28. 1929; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951; Moldenke, Résumé Suppl. 4: 19 & 20. 1962.

In the Richter reference given above it is stated "In Diss. de

Pl. hybrid. (Am. acad. tom. 3. p. 43) commemor. planta inter hanc et V. spuriam enata, solis fol. multifido-laciniatis ab hastata diversa, nom.: 'V. tetrandra, spicis longis acum., fol. multif.-lac.' mox periit, hinc ignota."

VERBENA BAJACALIFORNICA Moldenke

Additional citations: MEXICO: Baja California: Shreve 7169 (W-1749073—isotype).

VERBENA BALANSAE Briq.

Additional bibliography: Fedde in Just, Bot. Jahresber. 33 (1): 632. 1906.

Additional citations: PARAGUAY: Jörgensen 4582 (W—1541008). ARGENTINA: Corrientes: Pedersen 2906 (W—2283152).

VERBENA BALLSII Moldenke

Additional citations: ARGENTINA: Jujuy: Balls B.6036 [U. S. Nat. Arb. 163273] (W—2250243—isotype).

xVERBENA BEALEI Moldenke

Emended bibliography: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2210. 1951.

VERBENA BERTERII (Meisn.) Schau.

Additional and emended bibliography: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951; Moldenke, Résumé Suppl. 4: 5 & 15. 1962.

Herbarium material of this species has been misidentified and distributed as V. dissecta Willd. and as V. lipozygioides Walp.

Additional citations: CHILE: Santiago: G. T. Hastings 190 (W—530087); R. A. Philippi 1298 (W—1323088); Wilkes s.n. [Between Valparaíso and San Diego] (W—71950). Valparaíso: Buchtien s.n. [8.IX.1895] (W—1159365); Claude-Joseph 3548 (W—1283379); Killip & Pisano 39710 (W—1953999). Province undetermined: Claude-Joseph 4013 [Bureo] (W—1284313), 4450 [Vicuña] (W—1283808).

VERBENA BIPINNATIFIDA Nutt.

Additional synonymy: Verbena bipinnata Nutt., in herb.

Additional and emended bibliography: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951; Shinners, Spring Fl. Dallas 325. 1958; Moldenke, Résumé Suppl. 4: 21 (1962) and 5: 3 & 4. 1962; Pearce Seeds & Plants, Our Am. Wild Fls. 10. 1962.

This species has been collected on ballast about eastern ports in the United States. The Pearce horticultural supply company describes the species as an "ever-blooming annual". The corolla is described as "deep-pink" by Kearney & Peebles. The Geyer 107 cited below has been previously identified as V. bracteosa Michx., V. aubletia L., and V. ambrosifolia Rydb.! The E. Hall 431 collection is a mixture with V. pumila Rydb. and was identified by the collector as V. bracteosa-aubletia.

The Earle & Earle 322, Eastwood 140, Fendler 586, G. L. Fisher 18, Griffiths 4244, Harward 9 & 14, C. L. Herrick 513, P. C. Standley 4951, Tweedy 102, Wooton 363, 2832, 2833, and s.n. [Glorieta, Aug. 24, 1910], and Zuck s.n. [Holbrook, Aug. 10, 1896], distributed as V. bipinnatifida, are all V. ambrosifolia Rydb., as is also Wooton 642, distributed as "Verbena bipinnatifida x wrightii". The Cazier s.n. [6 mi. E. Portal, Aug. 27, 1955], Mearns 2486, O. B. Metcalfe 1231, P. C.Standley s.n. [mesa just west of Organ Mts., June 13, 1906], and Wooton s.n. [Organ, July 14, 1897] are all V. ambrosifolia f. eglandulosa Perry, while Rose & Fitch 17106 is V. bracteata Lag. & Rodr.; Waugh 168 is V. canadensis (L.) Britton; Maysilles 7039 is V. ciliata Benth.; Wooton 3849 is V. ciliata var. pubera (Greene) Perry; H. H. Rusby 337, Tidestrom 772 & 898, Toumey s.n. [Galiuro Mts., July 29, 1894], T. E. Wilcox 26 & s.n. [near Williams, April 11, 1905], and Zuck s.n. [Tucson, May 16, 1896] are all V. gooddingii Briq.; Lindheimer s.n. [Texas] and C. T. Mohr s.n. [N. Orleans] are V. halei Small; Kearney & Peebles 9802 and E. W. Nelson 4856 are V. bipinnatifida var. latilobata Perry; G. L. Fisher 207 & 223, Maysilles 7684, Edw. Palmer 74, and Pringle 1117 are V. ciliata Benth.; J. K. Small s.n. [near Wharton, April 12, 1925] is V. ciliata var. longidentata Perry; and Mearns 109, F. G. Plummer s.n. [Lincoln National Forest, 1903], and Wooton s.n. [Divide above Mescalero Agency, June 23, 1895] & s.n. [White Sands, Aug. 25, 1899] are V. wrightii A. Gray.

Kearney says of Toumey s.n. [Santa Catalina Mts., Sept. 20, 1896] and Edw. Palmer s.n. [Arizona, 1869] in the United States National Herbarium "Why not V. bipinnatifida? Bracts nearly equalling calyx", but I regard both collections as V. ambrosifolia f. eglandulosa Perry. He also says of Toumey s.n. [Santa Catalina Mts., Sept. 15, 1896] in the same herbarium "V. bipinnatifida. Bracts nearly equalling calyx. Appr[oaching] V. ciliata in other characters", and of J. I. Carlson s.n. [Douglas, May 13, 1915] "V. bipinnatifida?", but I regard both collections as V. ambrosifolia f. eglandulosa. The Wynd & Mueller 450 cited by me in Phytologia 8: 251 on re-examination will probably prove to be V. ciliata, as are the Maysilles 7039 & 7057 there cited.

Additional citations: ALABAMA: Dallas Co.: R. M. Harper 15 (W—1365890). MISSISSIPPI: Oktibbeha Co.: Weatherby & Weatherby 6313 (W—1604087). INDIANA: Clark Co.: Umbach s.n. [Clarke, June 29, 1898] (W—339478). SOUTH DAKOTA: Fall River Co.: Rydberg 935 (W—210967). Lyman Co.: Over 3177 (W—582996). Stanley Co.: Geyer 107 (W). Washington Co.: W. H. Over 2103 (W—582936). KANSAS: Barber Co.: B. B. Smyth 306 (W). Douglas Co.: W. H. Horr 4368 (W-

2097550); R. L. McGregor 12211 (W—2230321). Ellis Co.: A. S. Hitchcock 393 (W—353120). Meade Co.: W. H. Horr 3448 (W—2030691). Morton Co.: Carleton 177 (W, W); Rose & Fitch 17105 (W—639249). Osborne Co.: Shear 38 (W—227316). Riley Co.: A. Nelson 8245 (W—485794). Scott Co.: Fearing & Latham s.n. [August 14, 1950] (W—2030815). Smith Co.: W. H. Horr E.108 (W—2031069). Wabaunsee Co.: Bartley 1240 (W—1973587). MISSOURI: Jackson Co.: B. F. Bush 4029 (W—606119). ARKANSAS: Hempstead Co.: E. J. Palmer 8045 (W—1531506). LOUISIANA: Rapides Par.: C. R. Ball 401 (W—382754). Saint Mary Par.: Langlois s.n. [Cotes Blanches, 17.VII. 1893] (W-1465962). NEBRASKA: Boyd Co.: F. E. Clements 2776 (W). Sherman Co.: J. M. Winter 75 (W—1679019). OKLAHOMA: Beckham Co.: Demaree 12451 (W—1684883), 12451a (W—1684884). Bryan Co.: C. S. Sheldon 48 (W). Comanche Co.: Hopkins, Nelson, & Nelson 801 (W—1862752); Waterfall 13097 (W—2260931). Custer Co.: A. R. Moldenke 115 (Fg). Harper Co.: G. W. Stevens 305 (W—589065). Kingfisher Co.: Blankinship s.n. [Huntsville, Apr. 16, 1896] (W—313601). Lamar Co.: Demaree 12003 (W—1683782). Murray Co.: J. F. Brenckle 48065 (W—2003822); Merrill & Hagan 303 (W—1653007); G. W. Stevens 14 (W—588951). Woods Co.: G. W. Stevens 699 (W—589223). TEXAS: Bell Co.: L. F. Ward s.n. [Killeen, October 1, 1891] (W—147559); S. E. Wolff 2776 (W—1624007). Bexar Co.: C. R. Ball 909 (W—501971); Groth 30 (W—717649); G. Jermy 86 (W—315685), s.n. [S. Antonio] (W—392397); Larrabee s.n. [Alamo Heights, May 1, 1900] (W—444851); Mrs. H. D. Slater s.n. [San Antonio, 1918] (W—891772). Blanco Co.: Lundell & Lundell 10274 (W—1888919). Brazoria Co.: B. F. Bush 205 (W—386447), 449 (W—386544). Comal Co.: G. L. Fisher 93 (W—1104890); Lindheimer 1072 (W—502445), 1073 (W—502446). Dallas Co.: Lundell & Lundell 10416 (W—1887677), 10568 (W—1888955), 11315 [Plant. Exsicc. Gray. 1275] (W—1925785); J. Reverchon 739 (W—147561, W), s.n. [Curtiss 1962*] (W—1323050, W); M. B. Stephenson s.n. [vicinity of Dallas, Apr. 2, 1929] (W—1432649). DeWitt Co.: A. H. Howell 308 (W—501457). Fisher Co.: T. M. Shepherd s.n. [Grady, April 14, 1901] (W—413915). Frio Co.: Rose & Painter 6427 (W—451706). Guadelupe Co.: F. S. Earle 430 (W—480901). Hemphill Co.: A. H. Howell 111 (W—500236). Hood Co.: E. J. Palmer 6510 (W—1581014). Kaufman Co.: F. J. Tyler s. n. [vicinity of Terrell, May 4, 1904] (W—500802). Kerr Co.: Munson & Hopkins s.n. [Kerrville, Jul. 1889] (W—219990). Kinney Co.: Mearns 1252 (W—229499), 1274 (W—229520), 1394 (W—230042). Kleberg Co.: G. J. Harrison s.n. [Riviera, 2/24/30] (W—1532340). Liberty Co.: Small & Wherry 11781 (W—1738883). Navarro Co.: Joor 107 (W); E. J. Palmer 7821 (W—1531827). Nueces Co.: Marlatt s.n. [Nuecestown, May 27, 1896] (W—266973). Oldham Co.: C. L. Lundell

11462 (W—1926942). Parker Co.: S. M. Tracy 7999 (W—500368). Tarrant Co.: Killian 6779 (W—1465227); McKelvey 1679 (W—1581392); Ruth 107 (W—501767, W—1488932); L. F. Ward s.n. [Fort Worth, Sept. 9, 1877] (W—147557). Taylor Co.: S. M. Tracy 8000 (W—1442452). Tom Green Co.: Cory 50566 (W—1886002); Tweedy s.n. [Knickerbocker Ranch, May 1880] (W—147562). Travis Co.: E. Hall 431, in part (W). Uvalde Co.: J. M. Milligan s.n. [Uvalde, April] (W—504333). Val Verde Co.: G. L. Fisher 85 (W—1366096); Wooton s.n. [Del Rio, Nov. 5, 1913] (W—662058). Van Zandt Co.: J. B. Henderson 5698 (W—1468822). Victoria Co.: F. L. Lewton 60 (W); Maxon 3808 (W—500433); E. J. Palmer 9098 (W—1531874). Wichita Co.: Whitehouse 9589 (Mi), 9609 (Mi). County undetermined: Lindheimer III.289 (W—1871004, W). NEW MEXICO: Chaves Co.: Earle & Earle 526, in part (W—382588). County undetermined: C. Wright 1502 (W—56225). ARIZONA: Apache Co.: Edw. Palmer s.n. [Willow Spring, May 1890] (W—56212). Cochise Co.: Blumer 1345 [108] (W—561617, W—563255); Kearney & Peebles 14234 (W—1768656); H. N. Moldenke 21880 (Am, Fg); Ordway s.n. [Rustler Park, July 30, 1955] (Am). Coconino Co.: Kearney & Peebles 13983 (W—1732901); MacDougal 317 (W—334412); Mrs. C. D. Walcott s.n. [Grand Canyon, Aug. 1938] (W—1730904). Gila Co.: Collom 248 (W—1683284). Graham Co.: Darrow, Phillips, & Pultz 1122 (W—1899069); Kearney & Peebles 14153 (W—1732962); Peebles 12989 (W—1679125). Pima Co.: Peebles, Harrison, & Kearney 4549 (W—1368004). MEXICO: Chihuahua: E. W. Nelson 6117 (W—359829); Townsend & Barber 139 (W—383221). MOUNTED DESCRIPTIONS: Am. Midl. Nat. 24: 752. 1940 (W).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry

Emended bibliography: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951.

The Moore & Steyermark 3622 annotated as this variety in the United States National Herbarium by Perry is actually V. ambrosifolia Rydb. On the other hand, of the Eggleston 10737 identified by her in the same herbarium as V. ambrosifolia Kearney says "I make this [to be] V. bipinnatifida var. latilobata" and I agree with him! C. Wright 1503 in the same herbarium was misidentified as V. ambrosifolia.

Additional citations: ARIZONA: Cochise Co.: Eggleston 10737 (W—664802); Griffiths 4833 (W—496451); Herb. Chiricahua Veg.-Study Team 1959-442 (Am); A. R. Moldenke 138 (Am), 145 (Am); Ordway s.n. [Rustler Park, July 30, 1955] (Am); T. E. Wilcox s.n. [near Fort Huachuca, Sept. 1894] (W—212941). Gila Co.: Peebles & Smith 14093 (W—1732943). Graham Co.: Kearney & Peebles 9802 (W—1624416). Pima Co.: Griffiths & Thornber 159 (W—497223); M. E. Jones s.n. [Santa Rita Mts., Aug. 24, 1903] (W—856989). Santa

Cruz Co.: Kearney & Peebles 10130 (W--1624502). MEXICO: Chihuahua: E. W. Nelson 4856 (W--332903); C. Wright 1503, in part (W--71927). Michoacán: Hinton 13125 (W--1891037). Sonora: Hartman 906 (W--1892542--isotype).

xVERBENA BLANCHARDI Moldenke

Emended synonymy: Verbena blanchardii Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210, sphalm. 1951.

Emended bibliography: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951.

The E. W. Lathrop 369 & 488, distributed as xV. blanchardi, are actually xVerbena moechina Moldenke.

VERBENA BONARIENSIS L.

Additional synonymy: Verbena bonaerensis L., in herb.

Additional and emended bibliography: C. Murr., Brit. Gard. 2: 479. 1799; Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825; Benth. & Muell., Fl. Austral. 5: 36—37. 1870; E. H. L. Krause in Sturm, Fl. Deutschl. 15: 305. 1907; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2208—2210. 1951; Rambo, Sellowia 7: 260. 1956; Moldenke, Résumé Suppl. 4: 1—5, 14, 16, & 19 (1962) and 5: 1—3. 1962.

Emended illustrations: Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2210. 1951.

An additional common name is "cluster-flower'd vervain". The species was apparently already in cultivation in England in 1799 according to the Murray reference cited above. It has been collected on dry hillsides in Jamaica.

For those students interested in noting the rapidity of spread of introduced plants, the following dates when this species was first collected in a given county(as far as I am now aware) will be of interest: North Carolina: Bladen, Currituck, and New Hanover Counties - 1950; South Carolina: Charleston County - 1879, Georgetown County - 1939; Georgia: Richmond County - 1899, Chatham County - 1929, Calhoun County - 1947; Alabama: Tuscaloosa County - 1938; Mississippi: Rankin County - 1927; Arkansas: Saint Francis County - 1925, Ashley and Drew Counties - 1938, Bradley County - 1939; Louisiana: Terrebonne Parish - 1931, Tangipahoa Parish - 1938; Texas: Tyler County - 1939, Jefferson County - 1948; California: Yuba County - 1938, Marin County - 1943, Fresno County - 1946; Bermuda - 1921.

The E. Carter 91, E. S. Ford 3785, Godfrey & Shunk 4072, and L. S. Rose 39200, distributed as V. bonariensis, are all V. brasiliensis Vell., as are also Campos Novaes 916, A. Carvalho s.n. [Herb. Inst. Bot. S. Paulo 190], Claude-Joseph 1286, Dusén 14320, Julio 49, Mexia 5275, T. Meyer 4245, Miers s.n. [Mendoza], and Semper 293. The Buchtien 4683 and Cárdenas 327, distributed as V. bonariensis, are V. hispida Ruíz & Pav.; G. L. Fisher 168, A. A. Heller 2046, Hosaka 1354, and Mendes Magalhães 3151 are V. litoralis H.B.K.; and

Barkelew [not "Barkeley" as stated in Phytologia 8: 257. 1962] 231 and O. Solís 20 are V. sphaerocarpa Perry.

Bentham (1870) cites the following additional specimens not as yet seen by me: AUSTRALIA: New South Wales: Beckler s.n. [Hastings river]; F. Mueller s.n. [near Sydney]; C. Stuart s.n. [New England]. Queensland: F. Mueller s.n. [Brusbane river, Moreton Bay].

Additional citations: NORTH CAROLINA: Currituck Co.: W. B. Fox s.n. [1/2 mi. n. of Point Harbor] (W--2265467). Wayne Co.: A. R. Moldenke 463 (Fg). SOUTH CAROLINA: Charleston Co.: Curtiss 1963** (W), s.n. [Charleston, 1875] (W); L. R. Gibbs s.n. (W--203816, W--203817); W. Palmer s.n. [Charleston, June 2--10, 1902] (W--513666). Columbus Co.: A. R. Moldenke 452 (Fg). Florence Co.: A. R. Moldenke 453 (Fg). Georgetown Co.: Godfrey & Tryon 268 (W--1837175). Horry Co.: A. R. Moldenke 454 (Fg). Kershaw Co.: A. R. Moldenke 443 (Fg). Lee Co.: A. R. Moldenke 446 (Fg). Lexington Co.: A. R. Moldenke 434 (Fg). GEORGIA: Bibb Co.: A. R. Moldenke 371 (Fg). Bleckley Co.: A. R. Moldenke 379 (Fg). Brooks Co.: A. R. Moldenke 308 (Fg), 312 (Fg). Burke Co.: A. R. Moldenke 406 (Fg). Calhoun Co.: R. F. Thorne 3659 (W--1929865). Grady Co.: A. R. Moldenke 298 (Fg). Jefferson Co.: A. R. Moldenke 405 (Fg). Lanier Co.: A. R. Moldenke 327 (Fg). Monroe Co.: A. R. Moldenke 387 (Fg). Screven Co.: A. R. Moldenke 416 (Fg). FLORIDA: Bradford Co.: Murrill 534 (W--1928354). Liberty Co.: A. R. Moldenke 278 (Fg). Marion Co.: Gist 105 (W--1653820). ALABAMA: Tuscaloosa Co.: R. M. Harper 3672 (W--1731623). MISSISSIPPI: Madison Co.: McDougall 1383 (W--1924874). LOUISIANA: Ouachita Par.: J. A. Drushel 9478 (W--1654135). Saint Tammany Par.: Arsène 11859 (W--1031873), 12534 (W--1222964). TEXAS: Angelina Co.: Tharp 2558 (W--1221348). Harris Co.: A. R. Moldenke 216 (Fg). Jefferson Co.: J. F. Brenckle 48071 (W--2003825); A. R. Moldenke 222 (Fg). CALIFORNIA: Marin Co.: J. T. Howell 19323 (W--1872594). Yuba Co.: A. A. Heller 15162 (W--1974207). BERMUDA ISLANDS: Main: Brown & Britton 98 (W--1341080); F. S. Collins 266 (W--717560). JAMAICA: J. H. Hart s.n. (W--1323053); Killip 307 (W--1045096); Maxon 2615 (W--520584); Maxon & Killip 569 (W--1046299); C. R. Orcutt 2736 (W--1411664). BRAZIL: Minas Gerais: F. C. Hoehne s.n. [Herb. Inst. Bot. S. Paulo 2912] (N); Kuntze s.n. [Contendos, Dec. '92] (N); Regnell II.210 [Caldas] (N), II.210 [1843] (W--2096141). Rio de Janeiro: Holway & Holway 1180 (W--1188224), 1454 (W--1199294); Lund s.n. [Rio] (N). Rio Grande do Sul: Rambo 51444 (W--2102030). São Paulo: F. C. Hoehne s.n. [Herb. Inst. Bot. S. Paulo 1361] (N); Usteri s.n. [Herb. Esc. Polytec. 254b; Herb. Inst. Bot. S. Paulo 15724] (N). BOLIVIA: Santa Cruz: Cárdenas 5130 (W--2250684). PARAGUAY: Jürgensen 3768 (W--1483628). URUGUAY: Herter

268 [Herb. Herter 81709] (N, W--1341848); Lorentz 934 (W--1233689). CHILE: Curicó: Herb. Mus. Nac. Santiago 4 (N). Llanquihue: Gunckel 16865 (W--1997763). Valdivia: Buchtien s.n. [Valdivia, 1898] (W--1159368); H. Krause s.n. [Coral] (W--1690233). ARGENTINA: Buenos Aires: Brizuela 1459 (W--2198122). Chaco: Venturi 84 (W--1043709). Corrientes: Pedersen 1333 (W--2283062). Misiones: Pedersen 4341 (W--2283778). Tucumán: Venturi 123 (W--1591212), 525 (W--1591223), 2936 (W--1591273). AZORES ISLANDS: Faial: C. S. Brown 215 (W--262278). REPUBLIC OF SOUTH AFRICA: Natal: Sidey 2058 (S). Transvaal: Schlieben 7176 (W--2272136). INDIA: Uttar Pradesh: R. R. Stewart 16007 (W--1992151). State undetermined: C. B. Clarke 24476G [Dhurmsala] (W--802905). MELANESIA: New Caledonian Islands: Ile des Pins: M. R. Germain s.n. [U. S. Nat. Arb. 218555] (W--2185103). New Caledonia: Franc A.1693 [U. S. Nat. Arb. 218556] (W--2185088). POLYNESIA: Austral Islands: Saint Mary's: Eights s.n. (W--920098).

VERBENA BONARIENSIS f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Résumé Suppl. 4: 5 & 6. 1962.

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional bibliography: Moldenke, Résumé Suppl. 4: 2. 1962.

Additional citations: PARAGUAY: Jörgensen 3774 (W--1484054).

VERBENA BRACTEATA Lag. & Rodr.

Additional synonymy: Verbena bracteosa brevibracteata Gray, in herb.

Additional and emended bibliography: Spreng. in L., Syst. Veg., ed. 16, 2: 749. 1825; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951; Shinners, Spring Fl. Dallas 325. 1958; Moldenke, Résumé Suppl. 4: 1, 3, & 4 (1962) and 5: 1—5 & 7. 1962; Lehr, Bull. Torr. Bot. Club 89: 56. 1962.

Herbarium material of this species has also been misidentified and distributed as V. remota Benth. The Herb. Arizona State Coll. s.n. [near Southwestern Research Station, 4 May '57], distributed as V. bracteata, is actually V. ambrosifolia f. eglandulosa Perry, while Pataky s.n. [Fort Huachuca, 1890] is V. gracilis Desf.; Rugel s.n. [ad vias et in incultis arenosis, per Alabamam mediam, Sept. 1843] is V. canadensis (L.) Britton; E. W. Hammond 322 is V. lasiostachys var. septentrionalis Moldenke; and J. Let s.n. [San Diego, Nov. 9] is V. menthaefolia Benth.

The A. H. Howell 159.1 & 159.2 and C. Thomas s.n. [Colorado Terr., 1869] collections are mixtures with V. ambrosifolia Rydb. The H. R. Bennett s.n. [Brewster Arnold Ranch, August 2, 1957] specimen cited below bears a notation, probably by the collector, "evidently a hybrid with V. stricta Vent. or some other species", but I do not agree — to me it seems to be typical V. bracteata.

A common name for the species in Mexico is "chichiro". Lehr (1962) records V. bracteata from Rockland County, New York.

Additional citations: ALBERTA: Macleod Co.: E. H. Moss 204 (W-1896368). BRITISH COLUMBIA: Cariboo Co.: J. Macoun s.n. [Kamloops, June 13th 1889] (W--219610). Yale Co.: Calder & Savile 9668 (W--2310062). NEW JERSEY: Hudson Co.: Van Sickle s.n. [Weehawken, July 20, '94] (W--309649), s.n. [Weehawken, Aug. 1894] (W--243276). PENNSYLVANIA: Lancaster Co.: A. A. Heller s.n. [August 29, 1900] (W--407053). Philadelphia Co.: Martindale s.n. [Phila., 8/78] (W-147565). VIRGINIA: Southampton Co.: A. A. Heller 1012 (W). NORTH CAROLINA: Iredell Co.: Ruger s.n. [Statesville] (W--310734). County undetermined: Ashe s.n. [Southeastern N. C.] (W--327849). GEORGIA: DeKalb Co.: J. K. Small s.n. [Stone Mtn., July 1--6, 1895] (W--298966). Gwinnett Co.: H. A. Allard 207 (W--513129). Lee Co.: J. D. Smith 151 (W--1323056), 1961 (W--1323057). FLORIDA: Franklin Co.: Biltmore Herb. 1082b (W--332102). ALABAMA: DeKalb Co.: Ruth 501 (W--345682). Jackson Co.: L. F. Ward s.n. [Stevenson, Sept. 5, 1877] (W--147564). Lee Co.: Earle & Baker s.n. [Auburn, 5/13/1898] (W--344792). Mobile Co.: C. T. Mohr s.n. [Mobile, May 22, 1884] (W--771884). Morgan Co.: J. D. Smith 152 (W--1323055). Tuscaloosa Co.: Pollard & Maxon 333 (W--442883). ILLINOIS: Cook Co.: H. H. Babcock s.n. [Chicago] (W--787353). Menard Co.: E. Hall s.n. [Athens, Sept. 1868] (W). St. Clair Co.: Eggert s.n. [E. St. Louis, June 11, 1879] (W--754560). County undetermined: G. R. Vasey s.n. [Illinois] (W--314208). INDIANA: Howard Co.: Ek 16 (W--1849580). Lake Co.: Umbach s.n. [Lake Station, June 6, 1896] (W--339477). Steuben Co.: C. C. Deam 1272 (W--607256). Vigo Co.: Evermann s.n. [Terre Haute, June 17, 1889] (W--645927). County undetermined: H. W. Clark 1745 [Keen's, Lake Maxinkuckee] (W--407572). IOWA: Fayette Co.: Fink 210 (W--214899). Henry Co.: R. A. Davidson 2456 (W--2261079). Johnson Co.: Somes 3596 (W--672324). Story Co.: C. R. Ball 86 (W--280243); H. S. Fawcett 12 (W--493389). KENTUCKY: Jefferson Co.: C. W. Short s.n. [borders of the Ohio below Louisville] (W--771885). WISCONSIN: Trempealeau Co.: Hartley & Hartley 372 (W--2261772); F. J. Hermann 8954 (W--1732399). County undetermined: "J. H. S." s.n. [July 22, 1887] (W--752025). MINNESOTA: Mille Lacs Co.: E. P. Sheldon s.n. [Princeton, July 1892] (W). Ramsey Co.: Mearns 524 (W--649504). NORTH DAKOTA: Benson Co.: Lunell s.n. [Leeds, October 7, 1915] (W--893170). Cass Co.: O. A. Stevens s.n. [Fargo, Aug. 17, 1949] (W--1973377). Morton Co.: Sarvis 122 (W--584955). SOUTH DAKOTA: Custer Co.: Over 1779 (W--582808). Jackson Co.: J. F. Brenckle 39-74 (W--1826779). Lawrence Co.: W. P. Carr 179 (W--751175); Rydberg 934 (W--210966). Meade Co.: Forwood 298 (W--317830). Washington Co.: Over 2389 (W--582964). KANSAS: Douglas Co.: W. H. Horr E.570 (W--2031273); W. C.

Stevens s.n. [Lawrence] (W—216102). Finney Co.: Coville 24 (W—361474); Meuble s.n. [Garden City, June 7, 1891] (W—244965). Grant Co.: C. H. Thompson 42 (W—270168). Jewell Co.: W. H. Horr 4394 (W—2097565). Kearney Co.: A. S. Hitchcock 1129 (W—353932). Marion Co.: W. H. Horr 3472 (W—2030700). Morton Co.: Rose & Fitch 17106 (W—639250). Osborne Co.: Shear 62 (W—227339), 101 (W—227314). Riley Co.: J. B. S. Norton 392 (W—353119). Woodson Co.: E. W. Lathrop 1276 (W—2235252). Wyandotte Co.: G. Smith s. n. [Kansas City, July 26, 1871] (W—2311016). MISSOURI: Greene Co.: P. C. Standley 9362 (W—688277). Saint Louis: Eggert s.n. [waste places, St. Louis, 2 July 1875] (W—1323059); Engelmann s.n. [St. Louis, Sept. 1841] (W). Wayne Co.: E. J. Palmer 6106 (W—1581048). ARKANSAS: Craighead Co.: Demaree 7027 (W—1438449). Pulaski Co.: Demaree 8623 (W—1582392). Saline Co.: F. C. Haas 181 (W—1654359). Sebastian Co.: Bigelow s.n. [Fort Smith] (W). LOUISIANA: Rapides Par.: C. R. Ball 553 (W—382825). MONTANA: Dawson Co.: L. F. Ward s.n. [Glendive, July 17, 1883] (W—147563). Gallatin Co.: Blankinship I.410 (W—540464). Glacier Co.: P. C. Standley 18764 (W—1026465). Jefferson Co.: R. Adams s.n. [between Madison & Jefferson rivers, Sept. 7, '71] (W—235943). Powell Co.: E. L. Morris s.n. [Gold Creek, August 1894] (W—2328727). Rosebud Co.: H. R. Bennett s.n. [10 mi. east of Lame Deer, 7-25-57] (W—2300907), s.n. [Brewster Arnold Ranch, August 2, 1957] (W—2300906). Sanders Co.: Sandberg, MacDougal, & Heller 972 (W—238477). Sweet Grass Co.: Eggleston 7970 (W—544156). IDAHO: Ada Co.: J. A. Clark 55 (W—543356), 279 (W—543455). Bingham Co.: J. M. Coulter s.n. [Blackfoot, 1872] (W—235942); Edw. Palmer 255 (W—288316). Bonner Co.: Epling 10380 (W—1604456). Canyon Co.: Macbride 200 (W—542184). Custer Co.: L. F. Henderson 4070 (W—240327). Fremont Co.: E. D. Merrill 429 (W—390839); Merrill & Wilcox 776 (W—580875). Idaho Co.: Q. Jones 366 (W—2054330). Nez Perce Co.: L. F. Henderson s.n. [near Lewiston, June 18, '94] (W—226468); Sandberg, MacDougal, & Heller 264 (W—242923). WYOMING: Albany Co.: A. Nelson 7671 (W—433812). Natrona Co.: Goodding 207 (W—485108). Niobrara Co.: F. H. Knowlton 148 (W—272918). Yellowstone National Park: Mearns 302 E.C.S. (W—488863), 2698 (W—487268), 5009 (W—488519). County undetermined: A. Nelson 320 (W—284505). UTAH: Emery Co.: M. E. Jones 5478 (W—249911). Grand Co.: Rydberg & Garrett 8365 (W—765012). Kane Co.: Tidestrom 2390 (W—508099). Piute Co.: Rydberg & Carlton 7043 (W—506429). Salt Lake Co.: S. Watson 823 (W). San Juan Co.: Rydberg & Garrett 9201 (W—765186). Sanpete Co.: Tidestrom 161 (W—506968); L. F. Ward 256 (W—147566, W—221200). Utah Co.: Tidestrom 1735 (W—507242). NEVADA: Clark Co.: Alexander & Kellogg 1739 (W—1826991); Clokey

8096 (W—1785517). Lander Co.: A. E. Hitchcock 583 (W--765930). Storey Co.: Purpus 5946 (W--348137). County undetermined: S. G. Stokes s.n. [Grand Junction, June 15, 1900] (W--404499). COLORADO: Archuleta Co.: C. F. Baker 564 (W—368089). Boulder Co.: Ewan s.n. [Pl. Exsic. Gray. 1090] (W—1828391). Conejos Co.: P. C. Standley 6496 (W--685518). Denver Co.: Eastwood 25 (W—582271); H. G. Smith Jr. s.n. [Plains near Denver, Sep. 9, 1888] (W). Eagle Co.: Killip 36454 (W--1829030). El Paso Co.: Biltmore Herb. 1082c [1-344] (W—980795); Clements & Clements 9 (W—580010); Curtiss s.n. [Colorado Springs] (W--202204). Gunnison Co.: C. F. Baker 920 (W-412533). La Plata Co.: Tweedy 433 (W--370445); Wooton 2836 (W—562272, W—737206). Larimer Co.: J. H. Cowen 404 (W—254916), 2019 (W--489493). Montrose Co.: C. F. Baker 288 (W--411953); E. P. Walker 402 (W—543789). Otero Co.: Crandall s.n. [Rocky Ford, June 13, 1891] (W--216753); Rose & Fitch 17503 (W—760579). Washington Co.: H. L. Shantz 1084 (W--583884), 1200 (W—584004), 1229 (W—584011). County undetermined: C. Thomas s.n. [Colorado Terr., 1869] (W—71930). NEBRASKA: Buffalo Co.: J. H. Holmes 12 (W), 20 (W). Cass Co.: T. A. Williams s.n. [Weeping Water, June 1885] (W—750381). Cedar Co.: F. E. Clements 2612 (W). Lancaster Co.: Seal s.n. [Lincoln, 6-10-94] (W--2311054); H. J. Webber s.n. [Lincoln, June 20, 1888] (W--216319); T. A. Williams s.n. [Lincoln, June 5, 1889] (W—750382). Thomas Co.: Rydberg 1306 (W—210371). OKLAHOMA: Beckham Co.: A. R. Moldenke 116 (Fg). Caddo Co.: Demaree 12533 (W--1683845). Cimarron Co.: C. M. Rogers 4668 (W—2053022). TEXAS: Deaf Smith Co.: A. R. Moldenke 121 (Fg). Donely Co.: A. R. Moldenke 119 (Fg). El Paso Co.: B. Barlow s.n. [Camitillo, 7 July 1911] (W—1521741); Dieffenderffer 90 (W—2311831); G. R. Vasey s.n. [El Paso, May 1881] (W--155632); C. Wright 454 (W). Grady Co.: A. R. Moldenke 118 (Fg). Hale Co.: Whitehouse 9926 (Mi). Howard Co.: Havard s.n. [w. of Big Spring, Sept. 1881] (W--155631, W—221203). Lamb Co.: Tharp 6274 (W—1465159). Lipscomb Co.: A. H. Howell 63 (W--500188). Lubbock Co.: Demaree 7704 (W—1469002); E. L. Reed 3058 (W--1520199), 3291 (W-1520198); Tharp 6284 (W--1465165); Wooton s.n. [Lubbock, May 3, 1925] (W—1244608). Moore Co.: Jespersen & Jespersen 2708 (W—2003035). Potter Co.: C. R. Ball 1675 (W—503065). Randall Co.: J. F. Baker 42 (W--500414). Tarrant Co.: Killian 6784 (W--1465230); Ruth 109 (W—501769); Whitehouse 16263 (Mi). Taylor Co.: S. M. Tracy 8001 (W—442453). Val Verde Co.: Parry, Bigelow, Wright, & Schott 829 (W—56193). Wheeler Co.: A. R. Moldenke 117 (Fg). County undetermined: Havard s.n. [Texas, Spt. 1881] (W--221199). NEW MEXICO: Bernalillo Co.: C. C. Ellis 221 (W—662639). Catron Co.: A. R. Moldenke 157 (Fg, Z). Chaves Co.: Earle & Earle 351 (W—

382500). Colfax County: Cockerell s.n. [Raton, Aug. 29, 1900] (W-562274); Griffiths 5560 (W--496719); P. C. Standley 6268 (W--685299), 11249 (W--897032). Dona Ana Co.: P. C. Standley 474 (W--564402), s.n. [Mesilla Valley, June 15, 1906] (W--560977); Wooton s.n. [Mesilla Valley, May 17, 1893] (W--241169), s.n. [San Augustine Ranch, Aug. 28, 1897] (W--736942); Wooton & Standley s.n. [Mesilla Valley, July 28, 1907] (W--561429). Eddy Co.: Wooton s. n. [vicinity of Queen, Aug. 2, 1909] (W--564655, W--736936). Grant Co.: O. B. Metcalfe 137 (W--495254). Guadalupe Co.: A. R. Moldenke 125 (Fg). Lincoln Co.: A. R. Moldenke 131 (Fg). Quay Co.: G. L. Fisher 152 (W--660110); A. R. Moldenke 122 (Fg). Rio Arriba Co.: Cockerell s.n. [No Agua, Aug. 1912] (W--691096); P. C. Standley 6602 (W--685624); Standley & Bollman 10852 (W--689538); Wooton s.n. [Aug. 16, 1904] (W--736937). San Juan Co.: P. C. Standley 6927 (W--685936), 7252 (W--686223), 7896 (W--686843); Wooton 2831 (W--736935), 2834 (W--736940), s.n. [Farmington, Aug. 8, 1904] (W--562254). San Miguel Co.: P. C. Standley 4549 (W--498776), 5136 (W--499113); Studhalter S.3028 (W--1735151). Santa Fe Co.: P. C. Standley 4458 (W--498751); Wooton s.n. [near Tesuque, Aug. 20, 1904] (W--736941). Sierra Co.: O. B. Metcalfe 1008 (W--497890). Socorro Co.: H. H. Rusby 6512a (W--147567). Torrance Co.: A. R. Moldenke 129 (Fg). Union Co.: A. H. Howell 159.2 (W--495047). County undetermined: Fendler 587 (W); Wooton s.n. [Inscription Rock, Aug. 1, 1892] (W--736939), s.n. [Gallo Spring, July 13, 1906] (W--736938). ARIZONA: Coconino Co.: Clute 93 (W--1070295); Collom 723 (W--1729448); Fernow s.n. [Little Colorado River, August '96] (W--479895); MacDougal 286 (W--334382); A. R. Moldenke 149 (Fg); G. A. Pearson 4 (W--563054), 355 (W--563246). Navajo Co.: Mrs. Hough s.n. [Holbrook, June 1905] (W--890166); Peebles 9636 (W--1624366); L. F. Ward s.n. [Holbrook, June 15, 1901] (W--410318); Wooton s.n. [7/19/1892] (W--241170). Yavapai Co.: Peebles, Harrison, & Kearney 4243 (W--1367578). WASHINGTON: Douglas Co.: Sandberg & Leiberg 340 (W--288317). Franklin Co.: Leekenby s.n. [Pasco, Aug. 8, 1898] (W--622148). Kittitas Co.: Cotton 1363 (W--525459); J. W. Thompson 9067 (W--1419794). Klickitat Co.: Suksdorf s.n. [July 22, 1881] (W--147585). Stevens Co.: Kreager 474 (W--441290). Walla Walla Co.: R. M. Horner 18 (W--281424); Wilkes s.n. [Walla Walla, Oregon] (W). Whitman Co.: Elmer 324 (W--277025). Yakima Co.: Cotton 621 (W--525153). County undetermined: E. P. Sheldon 8202 (W--329122); G. R. Vasey 468 (W--296747). OREGON: Morrow Co.: J. W. Thompson 4880 (W--1436931). Sherman Co.: W. E. Lawrence 413 (W--983724). Umatilla Co.: H. E. Brown 58 (W--283048); Griffiths & Hunter 18 (W--527103); Leiberg 902 (W--288318). Union Co.: E. P. Sheldon 8856 (W--528497). Wasco Co.:

Isat s.n. [Williamson's Exped.] (W). County undetermined: Cusick 1967 [eastern Oregon] (W—354693). CALIFORNIA: Inyo Co.: Coville & Funston 953 (W—56220). Kings Co.: Kearney 2 (W—410798). Los Angeles Co.: Braunton 379 (W—465367). Monterey Co.: G. R. Vasey 512 (W—56219). San Bernardino Co.: Parish & Parish 2171 (W—56201, W—56222). Tulare Co.: Edw. Palmer 2699 (W—277861). County undetermined: Griffiths & Morris 49 [Humboldt River bottoms near Minnemucca] (W—402546); L. Schoenfeldt 2925 (W—240859). MEXICO: Baja California: C. R. Orcutt 223 (W—1323062). Chihuahua: E. Stearns 7 (W—502757). Coahuila: Edw. Palmer 1048 (W—56174). Sonora: P. B. Kennedy 7032 (W—1287203). CULTIVATED: Switzerland: Herb. Hort. Basil. s.n. [Aug. 1839] (W—264622). LOCALITY OF COLLECTION UNDETERMINED: Havard s.n. [Penitence] (W—218868); P. C. Standley s.n. [along the Rio Grande river, May 4, 1906] (W—564309). MOUNTED CLIPPINGS: Lag. & Rodr., Anal. Cienc. Nat. 4: 260. 1801 (W); Woot. & Standl., Contrib. U. S. Nat. Herb. 16: 166. 1913 (W).

VERBENA BRASILIENSIS Vell.

Additional and emended bibliography: Fedde in Just, Bot. Jahresber. 33 (1): 632. 1906; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951; Moldenke, Résumé Suppl. 4: 1—3 (1962) and 5: 1—5. 1962.

The Hammarlund 631 in the Stockholm herbarium, cited in Phytologia 8: 321 (1962) as this species, is actually V. parvula var. gigas Moldenke, while the Jörgensen 3767 [Herb. Osten 22248] in the Montevideo herbarium, cited on page 322 of the same work, seems, on re-examination, actually to represent V. litoralis H.B.K. The A. S. Kaltenborn 160 [Kaltenborn & Kaltenborn 160] cited by me in my Alph. List Cit. 2: 602 (1948) and in Phytologia 8: 321 (1962) is V. parvula Hayek.

Herbarium material of V. brasiliensis has been misidentified and distributed as V. bonariensis α brevibracteata Kuntze, "Verbenia litoralis H.B.K.", and "Stachytarpheta jamaicense (L.) Vahl". A common name for the plant in Peru is said to be "pepermo".

For students interested in the speed of spread of this species in the southern United States, the following dates are given when the species was first collected (as far as I am aware) in the various states and counties: Virginia: Warwick County - 1937; North Carolina: New Hanover County - 1897, Pender County - 1932, Northampton County - 1948, Brunswick County - 1949; South Carolina: Barnwell, Columbus, and Kershaw Counties - 1962; Georgia: Glynn County - 1923, Chatham County - 1927, Bacon, Bibb, Bleckley, Clinch, Dodge, Jeff Davis, Jefferson, Lowndes, Putnam, Screven, Telfair, Thomas, Twiggs, and Ware Counties - 1962; Florida: Escambia County - 1899, Washington County - 1930, Leon County - 1955, Taylor County - 1957; Alabama: Mobile County - 1893, Sumter County - 1960, Baldwin County - 1962; Mississippi: Forrest County - 1932,

Jones County - 1940, Jefferson County - 1946, Harrison County - 1949, Hancock County - 1950, Lee and Pike Counties - 1955, Jackson and Pearl River Counties - 1962; Louisiana: Plaquemines Parish - 1900, Orleans Parish - 1901, Terrebonne Parish - 1914, East Baton Rouge Parish - 1927, Jefferson Parish - 1937, Saint Tammany Parish - 1939, Tensas Parish - 1940, Calcasieu, Cameron, Iberia, Jefferson Davis, Saint Mary, and Washington Parishes - 1962; Texas: Hardin, Jefferson, and Orange Counties - 1945, Wharton County - 1946, Victoria County - 1962; California: San Joaquin County - 1903, Nevada County - 1941, Stanislaus County - 1958, Butte County - 1959.

Additional citations: VIRGINIA: Warwick Co.: Fernald & Long 7585 (W--1699825). NORTH CAROLINA: Bladen Co.: A. R. Moldenke 461 (Fg). New Hanover Co.: Biltmore Herb. 5707 (W--332104); Godfrey & Shunk 4072 (W--1767208); McCarthy 8 (W). SOUTH CAROLINA: Bamberg Co.: A. R. Moldenke 427 (Fg). Barnwell Co.: A. R. Moldenke 422 (Fg). Columbus Co.: A. R. Moldenke 457 (Fg). Dillon Co.: A. R. Moldenke 450 (Fg). Horry Co.: A. R. Moldenke 455 (Fg). Kershaw Co.: A. R. Moldenke 442 (Fg), 445 (Fg). Lee Co.: A. R. Moldenke 436 (Fg). Lexington Co.: A. R. Moldenke 433 (Fg). Marion Co.: A. R. Moldenke 449 (Fg). Orangeburg Co.: A. R. Moldenke 435 (Fg). Richland Co.: A. R. Moldenke 439 (Fg), 441 (Fg). GEORGIA: Bacon Co.: A. R. Moldenke 346 (Fg). Bibb Co.: A. R. Moldenke 369 (Fg). Bleckley Co.: A. R. Moldenke 376 (Fg). Chatham Co.: Kolthoff s. n. [Savanna, 27 Maj 1927] (W--1367190). Clinch Co.: A. R. Moldenke 329 (Fg). Dodge Co.: A. R. Moldenke 363 (Fg). Glynn Co.: McAtee 3295 (W--1114063); H. N. Moldenke 1184 (W--1581762). Jeff Davis Co.: A. R. Moldenke 354 (Fg). Jefferson Co.: A. R. Moldenke 404 (Fg). Lowndes Co.: A. R. Moldenke 320 (Fg, Z). Putnam Co.: A. R. Moldenke 389 (Fg). Screven Co.: A. R. Moldenke 413 (Fg). Telfair Co.: A. R. Moldenke 362 (Fg). Thomas Co.: A. R. Moldenke 306 (Fg). Twiggs Co.: A. R. Moldenke 390 (Fg). Ware Co.: A. R. Moldenke 336 (Fg). FLORIDA: Escambia Co.: Curtiss 6490 (W--357553); S. M. Tracy 8706 (W--510598). Washington Co.: F. S. Blanton 6598 (W--1485525); E. S. Ford 3785 (W--2230914). ALABAMA: Baldwin Co.: A. R. Moldenke 262 (Fg, Z). Mobile Co.: C. T. Mohr s.n. [July 4, 1893] (W--771881); A. R. Moldenke 261 (Fg). MISSISSIPPI: Harrison Co.: A. R. Moldenke 253 (Fg). Jackson Co.: A. R. Moldenke 258 (Fg). Jefferson Co.: McDougall 1036 (W--1925222). Pearl River Co.: A. R. Moldenke 249 (Fg). LOUISIANA: Assumption Par.: A. R. Moldenke 236 (Fg). Calcasieu Par.: A. R. Moldenke 226 (Fg). Cameron Par.: A. R. Moldenke 233 (Fg). Iberia Par.: A. R. Moldenke 229 (Fg). Jefferson Davis Par.: A. R. Moldenke 235 (Fg). Lafourche Par.: A. R. Moldenke 240 (Fg). Plaquemines Par.: Tracy & Lloyd 20 (W--383532). Saint Charles Par.: A. R. Moldenke 241 (Fg). Saint Mary Par.: A. R. Moldenke 231 (Fg). Saint Tammany Par.: A.

R. Moldenke 243 (Fg). Terrebonne Par.: A. R. Moldenke 238 (Fg). Vermilion Par.: A. R. Moldenke 234 (Fg). Washington Par.: A. R. Moldenke 247 (Fg), 248 (Fg, Z). TEXAS: Hardin Co.: C. L. Lundell 14083 (W--2235974). Harris Co.: A. R. Moldenke 213 (Fg, Z, Z). Jefferson Co.: J. F. Brenckle 48073 (W--2003826); C. L. Lundell 14136 (W--1927003); A. R. Moldenke 221 (Fg), 224 (Fg, Z). Liberty Co.: A. R. Moldenke 217 (Fg), 218 (Fg). Orange Co.: Cory 50840 (W--1886061). Victoria Co.: A. R. Moldenke 202 (Fg, Z). CALIFORNIA: Fresno Co.: E. Carter 91 (W--1926299). Yuba Co.: L. S. Rose 39200 (W). ECUADOR: Azuay: Rose, Pachano, & Rose 22845 (W--1022442), 22846 (W--1022443). PERU: Cuzco: Cook & Gilbert 271 (W--603500), 1208 (W--604407). BRAZIL: Minas Gerais: Mexia 5275 (W--1705014). Paraná: Dusén 14320 (W--1481776). Rio de Janeiro: Dusén 8 (W--1159395); Holway & Holway 1272 (W--1188243). São Paulo: Campos Novaes 916 (W--389887); A. Carvalho s.n. [Herb. Inst. Bot. S. Paulo 190] (W--1592285). BOLIVIA: Cochabamba: Cárdenas 3019 (W--1594061). La Paz: Julio 49 (W--1192637). PARAGUAY: Morong 128 (W--1417048). URUGUAY: Kuntze s.n. [Montevideo, 7/12/1891] (W--700691). CHILE: Valdivia: Claude-Joseph 2616 (W--1198543). Province undetermined: Claude-Joseph 1286 [Ramon] (W--1059300). ARGENTINA: Buenos Aires: Pedersen 349 (W--2122390). Corrientes: Pedersen 1911 (W--2283117). La Rioja: T. Meyer 4245 (W--1909186). Mendoza: Miers s.n. [Mendoza] (W--1421161); Semper 293 (W--2049690). Santiago del Estero: Luna Risso 4 (Gg--352667, N, N), 49 (N); Pierotti s.n. [Quebrada Tazana, April 4, 1944; Herb. Inst. Miguel Lillo 100888] (S). Tucumán: Bailetti 233 [Herb. Inst. Miguel Lillo 31392] (N); Gillegan & Ros s.n. [9 octubre 1950] (N); Venturi 50 [Herb. Inst. Miguel Lillo 31391; Herb. Osten 17263] (N, Ug). REPUBLIC OF SOUTH AFRICA: Cape of Good Hope: E. G. Bryant 1098 (Ka--92330); C. N. Lake s.n. [3-4-1922] (S). Natal: J. M. Wood 12122 (Vt). Transvaal: Repton 1300 (Z); Rodin 3917 (Ca--802719); Schlieben 7691 (N, W--2272478). MADAGASCAR: Cours 863 (P); Decary 17970 (P, S), 18178 (P). POLYNESIA: Hawaiian Islands: Oahu: A. A. Heller 2046, in part [Oahu] (Ca--104819); M. A. King s.n. [Oahu, 1902] (Ca--73591). CULTIVATED: Brazil: Dusén 8 (S). Maryland: McCann s.n. [9-15-36; seed from Brussels] (Md), s.n. [9-15-36; seed from Montevideo] (Md).

VERBENA BRASILIENSIS var. SUBGLABRATA Moldenke, Phytologia 3: 278. 1950.

Bibliography: Moldenke, Phytologia 3: 278 & 290. 1950; Moldenke, Résumé 121 & 471. 1959.

This variety differs from the typical form of the species in having its branches and stems glabrous or subglabrate and shiny, its inflorescences uniformly twice furcate, the primary peduncles

glabrous or subglabrate, the secondary peduncles and rachis puberulent, the bractlets non-ciliate, very minutely and obscurely puberulous or glabrescent, the calyx very minutely puberulent and not at all strigose.

The type of the variety was collected by Ernesto Barros Valenzuela (no. 8050) at San Fernando, Colchagua, Chile, on February 7, 1930, and is deposited in the Britton Herbarium at the New York Botanical Garden. The variety is known thus far only from the type specimen.

Citations: CHILE: Colchagua: Barros Valenzuela 8050 (N--type).

VERBENA CABRERAE Moldenke, Phytologia 1: 478--479. 1940

Bibliography: Moldenke, Phytologia 1: 478--479 (1940) and 1: 511. 1941; Moldenke, Lilloa 6: 325. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke, Lilloa 10: 346 & 382. 1944; Moldenke, Alph. List Cit. 1: 84. 1946; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 52. 1948; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 375, 575, & 599 (1948), 3: 808 & 908 (1949), and 4: 1077 & 1090. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97, 105, & 197. 1949; Moldenke, Phytologia 3: 135 (1949) and 3: 290 & 305. 1950; Moldenke, Inform. Mold. Set 49 Spec. 3. 1954; Moldenke, Résumé 115, 126, & 471. 1959; Moldenke, Résumé Suppl. 2: 5. 1960.

Perennial, prostrate, creeping or semi-creeping herb; stems and branches slender, obtusely tetragonal, rather sparsely appressed-pilose with whitish hairs, more densely so toward the apex and on younger parts; nodes annulate; principal internodes 2--4 cm. long; leaves decussate-opposite, usually with several smaller ones on very much abbreviated twigs in their axils; petioles slender, 5--10 mm. long, winged, white-strigose; leaf-blades very thin-chartaceous, uniformly green on both surfaces, ovate in outline, 3--6 cm. long and wide, deeply 3-parted to the base, the divisions laciniate or pinnatifid, the lobes oblong and acute (often sharply so), strigose-pilose with appressed whitish hairs on both surfaces; midrib and secondaries plane or subimpressed above, prominulous beneath; veinlet reticulation indiscernible on both surfaces; inflorescence terminal; peduncles very slender, appressed-strigose, 2.5--4.5 cm. long; spikes abbreviated, congested, many-flowered; flowers perfumed or odorless; calyx narrow-tubular, about 9 mm. long and 1 mm. wide, densely white-strigose; corolla varying from violet, rose-violet, violet-blue, or violet-white to clear-lilac, rose-lilac, blue-lilac, lilac-white, purple, or even vivid rose-red, its tube about 12 mm. long, the limb mostly blue, 7--9 mm. wide.

The type of this species was collected by Angel Lulio Cabrera (no. 4199) -- in whose honor it is named -- at Quebrada del Río Caraparí, department of Orán, Salta, Argentina, on July 15, 1937, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is most distinctive, and has been collected in anthesis from February to May, July, August, October,

and November, at altitudes of 410 to 1200 meters. It has been found in quebradas, in fertile soil at the edge of cultivated ground, in savanna formations, in sandy loam od savannas, and in very sandy soil, especially in swamps. A vernacular name is "verbena crespa". Jörgensen reports it as "abundant" in the province of Formosa, while Hunziker says that it is "rather frequent" in Salta and "abundant in falda" in Buenos Aires. Meyer, on the label of his no. 678, from Chaco, says "abundant at edge of roads, embankments, etc., odorless", but on the label of no. 678a says "very rare, perfumed". Both collections were identified as "Verbena tenuisecta Briq. forma" by Osten. The Venturi 4607, cited in Lilloa 6: 325 (1941) as V. cabrerae is actually the type collection of V. lilloana Moldenke; it was originally identified as "Verbena erinoides Lam. aff." and is the basis for the Tucumán records listed by me for V. cabrerae in previous publications.

Herbarium material of V. cabrerae has been misidentified and distributed in herbaria as V. calliantha Briq.

In all, 24 herbarium specimens, including the type, have been examined by me.

Citations: BOLIVIA: Santa Cruz: Cárdenas 4617 (W-2027163), 5235 (W—2250761); Peredo s.n. [Capital, 27.III.1946] (S, S), s. n. [Las Luntas, 20.I.1947] (Gg—353270, N); Steinbach 2533 [Herb. Osten 14799] (Ug), 2673 [Herb. Osten 14801] (Ug), 5444 [Herb. Osten 16227] (Ug). ARGENTINA: Buenos Aires: A. T. Hunziker 3861 (S); Pastore 1163 (Go). Catamarca: Pierotti s.n. [La Merced, 19-V-1944] (N). Chaco: T. Meyer 678 [Herb. Osten 22702] (Ug), 678a [Herb. Osten 22701] (Ug). Formosa: Jörgensen 2470 [Herb. Inst. Miguel Lillo 31725; Herb. Osten 14554] (N, Ug). Salta: Cabrera 4199 (N—type); A. T. Hunziker 1212 (W—1804100); Pierotti 6556 (N); Schreiter 3821 [Herb. Inst. Miguel Lillo 31492] (N); A. G. Schulz 5299 (Cb), 5337 (Z). Santiago del Estero: Ruiz Huidobro 3079 (Gg—353272, N).

VERBENA CALIFORNICA Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 79. 1942.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 79, 80, & 101. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Moldenke, Alph. List Cit. 2: 559. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 27 & 197. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Résumé 33 & 471. 1959; Moldenke, Résumé Suppl. 3: 29. 1962.

Herb, to about 60 cm. tall; stems several, erect, rigid, rather sharply tetragonal, rather densely hispid-hirsute toward the base with stiff white hairs 1—2 mm. long, less so toward the apex; principal internodes 2—4 cm. long; leaves decussate-opposite, sessile, clasping at the base, remaining bright-green even in drying; leaf-blades firmly chartaceous, rather rigid, oblanceolate-elliptic, 1.7—4 cm. long, 5—10 mm. wide, acute or subacute

at the apex, irregularly serrate with obtuse or subacute, more or less appressed, antrorse teeth except toward the base, attenuate with rather straight and subparallel margins to the rather broad clasping base, decidedly revolute along the margins from base to apex, harshly scabrous and rather densely hispid with long white bulbous-based hairs on both surfaces, especially above, the hairs eventually deciduous and leaving the bulbous bases, the hairs shorter and sparser beneath except on the midrib and larger veins (where the hairs are, however, not bulbous-based); midrib and the few ascending secondaries impressed above, very prominent beneath; veinlet reticulation usually obscure or indiscernible above, often slightly prominulous beneath; inflorescence terminal, spicate; spikes usually in 3's, the outer ones often again singly branched, the floriferous portion 14--35 cm. long, straight, stiff, erect, densely many-flowered, the short peduncles and elongated rachis similar to the stems in all respects, but usually much more shortly pubescent except at the base; bracts several, foliaceous, oblong, 1 cm. long or less, 2--3 mm. wide, firm, scabrous and hirsutulous, with prominent midrib beneath and revolute margins; bractlets ovate-lanceolate, 3--3.5 mm. long, 1.5--2 mm. wide, long-acuminate at the apex, scabrous and short-hirsutulous, ciliate-hirsutulous on the margins, at least toward the base, about equaling the fruiting-calyx or slightly shorter; flowers not known; fruiting-calyx light, tubular, 3.5--4 mm. long, 1.5--2 mm. wide, lightly scabrellous-hirsutulous; cocci oblong, about 2 mm. long, the dorsal surface brown and reticulated, the ventral surface densely beset with appressed white strigullae except at the base and apex.

The type of this species was collected by Robert Francis Hoover (no. 3870) three miles north of Keystone, Tuolumne County, California, on September 30, 1938, and is deposited in the herbarium of the University of California at Berkeley. The species has been collected at an altitude of 1300 feet, flowering and fruiting in June and July, but I have not as yet had time to dissect the flowers. Herbarium material has been misidentified and distributed as V. carolina L. and V. polystachya H.B.K. In all, 5 herbarium specimens and 2 mounted photographs, including the type, have been examined by me.

Citations: CALIFORNIA: Tuolumne Co.: Belshaw 2357 [Herb. U. S. Dept. Agr. Forest Serv. 16881] (Ca--124399); Hoover 2382 (Ca--766949), 3870 (Ca--type, N--isotype, N--photo of type, Z--photo of type). CULTIVATED: California: Belshaw s.n. [May 25, 1937] (Ca--565360).

VERBENA CALLIANTHA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059--1060. 1904.

Synonymy: Verbena erinoides Chod. (in part) ex Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059, in syn. 1904 [not V. erinoides Auth., 1959, nor Hook., 1959, nor Hook. & Arn., 1959, nor L., 1959, nor Lam., 1791, nor Poepp., 1847, nor Spreng., 1830,

nor Willd., 1947]. Verbena chamaedryfolia x tenuisecta Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059, in syn. 1904. Verbena calliantha var. genuina Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1060. 1904. Verbena melindroides x tenuisecta Osten ex Moldenke, Résumé 369, in syn. 1959. Verbena chamaedryfolia var. bipinnatisecta Kuntze ex Moldenke, Résumé 362, in syn. 1959.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1059--1060. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 10: 481--482. 1904; Prain, Ind. Kew. Suppl. 3: 187. 1908; Moldenke, Prelim. Alph. List Invalid Names 45. 1940; Moldenke, Suppl. List Invalid Names 8. 1941; Moldenke, Lilloa 6: 325--326 (1941) and 8: 429. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 44, & 101. 1942; Moldenke, Alph. List Invalid Names 46. 1942; Moldenke, Lilloa 10: 346 & 382. 1944; Moldenke, Alph. List Cit. 1: 16 & 263 (1946) and 2: 374, 375, 378, & 384. 1948; Moldenke, Castanea 13: 118. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97, 99, 105, & 197. 1949; Moldenke, Alph. List Cit. 3: 660, 693, 732, 746, 863, 908, & 913 (1949) and 4: 1089, 1090, & 1152. 1949; Moldenke, Phytologia 3: 134 & 135 (1949), 3: 290 (1950), 3: 453 (1951), and 5: 96. 1954; Moldenke, Inform. Mold. Set 49 Spec. 3 (1954) and 51 Spec. 4. 1956; Moldenke, Résumé 109, 115, 118, 126, 350, 362, 363, 369, & 471. 1959; Moldenke, Résumé Suppl. 1: 7. 1959; J. A. Clark, Card Ind. issue 26. n.d.

Suffrutescent herb, to 1 m. tall, usually much less; stems ascending, medium-stout, green, branched, more or less pilose-pubescent with antrorse hairs; branches ascending; middle internodes 3--8 cm. long; leaves decussate-opposite; petioles to 2 cm. long, shorter than or subequaling the lamina, antrorsely pilose-pubescent; leaf-blades green on both surfaces, ovate in outline, about 4 cm. long and 3 cm. wide, obtuse or subobtuse at the apex, palmately subpinnate-laciniate with obtusely incised-crenate often wider segments, broadly cuneate at the base and prolonged into the petiole, sparsely substrigose-pubescent with antrorse hairs above, more densely appressed-pubescent beneath; venation slightly impressed above, more or less prominulous beneath; inflorescence terminal, spicate; peduncles elongate, 3--15 cm. long; spikes congested, eventually to 5 cm. long; bractlets lanceolate, 4--5 mm. long, half as long as or subequaling the calyx, densely pubescent with antrorse hairs above; calyx long-tubular, about 10 mm. long, the tube about 8 mm. long, densely canescent-pubescent on the outside with straight antrorse hairs, rarely mixed with subsessile black glands, at maturity enlarged-urceolate, the mouth oblique, the teeth lanceolate-subulate, the anterior ones longer and to 2 mm. long, the posterior ones shorter and 1--1.5 mm. long, all finally connivent; corolla hypocrateriform, varying from blue, violet, or lilac to rose, rose-carmine, or purple, showy, large, the tube surpassing the calyx-teeth by 5--6 mm., equal, cylindric, glabrous or subglabrous outside, the limb 8--9 mm. wide, spreading, the lobes broad, obcordate, the larger ones 3--4 mm. long and 4 mm. wide, the terminal emargination to 1 mm.

deep; style exserted 2--3 mm. beyond the calyx-teeth after anthesis, incrassate toward the apex and there subbilobed; seeds sublinear-oblong, yellowish, 3--3.5 mm. long, 0.8 mm. wide, beautifully elevated-reticulate on the top.

The species is based on several collection made by Emil Hassler in Paraguay: no. 1782, collected on the campo at Sapucay in January, no. 3196, collected on the shores of Río Limpio in August, and no. 7615, collected in thickets near Concepcion in October, all deposited in the herbarium of the Conservatoire et Jardin Botaniques at Geneva.

The species has been found by collectors in fields and campos, in "campo espinillar", along railroad tracks, on streambanks and riverbanks, and growing as a weed in cultivated fields. Pedersen says that in Corrientes he found it in a rather low pasture on rich black earth, very wet after rains, and in places flooded. Montes reports it as rare in Misiones. It has been found in anthesis from August to March, at altitudes of from 700 to 2700 meters. A vernacular name reported is "margarita". Meyer states that in Chaco it is frequent on railroad embankments, in abandoned soil, etc.

Briquet notes that "Le V. calliantha est voisin de V. tenuisecta, dont il se sépare très facilement par l'indument, le mode de division des feuilles et l'ampleur relative de leurs lobes, la forme des bractées et des dents calicinales etc." What appears to be a natural hybrid between this species and V. cabrerae is discussed herein under xV. argentina Moldenke.

Herbarium material of V. calliantha has been misidentified and distributed as V. chamaedryfolia Juss., V. cheitmaniana Moldenke, "V. erinoides Lam. aff.", and V. santiaguensis (Covas & Schnack) Moldenke. The Fiebrig & Osten s.n. [Herb. Osten 8063] was claimed by Osten to be a hybrid between no. 8062 (V. peruviana?) and no. 8064 (V. tenuisecta) and growing between them. Osten 9014 was growing, he says, with no. 9013 (V. tenuisecta), and was identified by him first as V. melindroides Cham. x V. tenuisecta Briq. and then as V. chamaedryfolia var. bipinnatisecta Kuntze (probably an error for "subpinnatisecta Kuntze"). His no. 9015, type of V. melindroides x tenuisecta, was growing among V. peruviana and V. tenuisecta.

The Santa Cruz, Bolivia, record for V. calliantha given by me in my Résumé and elsewhere is based on Peredo s.n. [Las Juntas, 20-I-1947] which now proves to be V. cabrerae instead. The Monetti s.n. [Herb. Inst. Miguel Lillo 31696] and Lillo 3989 [Herb. Inst. Miguel Lillo 31691] cited in Lilloa 10: 346 (1944) are actually V. lilloana Moldenke, and the Bailetti 231 [Herb. Inst. Miguel Lillo 31690] and R. Schreiter 2358 [Herb. Inst. Miguel Lillo 32760] are V. dissecta Willd., as are also the Zabala 116 [Herb. Inst. Miguel Lillo 38045] cited in Lilloa 10: 382 (1944) and the

T. Meyer 3094 cited in Lilloa 6: 326 (1941). On the other hand, Cabrera 3169, cited by me in my Alph. List Cit. 1: 84 (1946) as V. dissecta, is actually V. calliantha, while Venturi 5264, cited as V. calliantha in Alph. List Cit. 4: 1090 (1949), is V. dissecta.

It is perhaps worth noting here that the other part of V. erinoides Chod. is V. storeoclada Briq., while V. erinoides Auth. is V. dissecta Willd., V. erinoides Hook., Hook. & Arn., L., Poepp., and Spreng. are all V. berterii (Meisn.) Schau., V. erinoides Lam. is V. laciniata (L.) Briq., and V. erinoides Willd. is V. ciliata Benth.

In all, 32 herbarium specimens, including the type collections of all the names involved, and 2 mounted photographs have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Schreiner 15 (Ja--46573); Schwacke s.n. [Herb. Saldanha 6326] (Ja--46578). BOLIVIA: Tarija: Pflanz 4056 (B, W--1341238). PARAGUAY: Fiebrig & Osten s.n. [Herb. Osten 8063] (N, Ug); Hassler 3196 [Macbride photos 24682] (Kr--photo of cotype, N--photo of cotype), 7615 (N--cotype); T. Meyer 16035 (N, W--2049913); Osten 9014 (Ug), 9015 (Ug); Pedersen 3240 (W--2283617); T. Rojas 2539 [Herb. Osten 18187] (N, Ug); A. G. Schulz 7789 (Cb). ARGENTINA: Catamarca: Brücher & Brücher s.n. [30/1/49] (S). Chaco: Cabrera 3169 (Ug); T. Meyer 141 [Herb. Osten 22664] (Ug); A. G. Schulz 1477 (N), 7945 (Z). Corrientes: Pedersen 1844 (Hi--193251, N, S, W--2283108); Ybarrola 542 (W--1931829). Formosa: Morel 1003 (N), 1214 (N). Misiones: Montes 2512 (W--1988288); D. Rodriguez 548 [Herb. Inst. Miguel Lillo 31367] (N). Salta: T. Meyer 4608 (Ca--906601). Tucumán: Olea 66 (Ca); Ruiz Leal 12618 (Ss); Venturi 3568 (S).

VERBENA CALLIANTHA var. MICROSOMA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1060. 1904.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1060. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 10: 482. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 101 (1942) and [ed. 2], 99 & 197. 1949; Moldenke, Résumé 118 & 471. 1959.

This variety differs from the typical form of the species in its smaller stature, being only 8--20 cm. tall, its smaller leaves, the blades of which are only 2 cm. long and 1 cm. wide, and their narrower segments, the shorter petioles, which are only 5 mm. long, the more slender peduncles, and the more reduced spikes.

The type of this variety was collected by Emil Hassler (no. 1272) in thickets near Cerro Pyta, Paraguay, in October, and is deposited in the herbarium of the Conservatoire et Jardin Botaniques at Geneva. I have as yet seen no material of this plant and

suspect that it may be merely a depauperate ecotype of the species.

VERBENA CAMERONENSIS L. I. Davis, Nature Leafl. Lower Rio Grande Valley Nature Club 1, pr. 1, [2—3]. August 14, 1941.

Synonymy: Verbena lundelliorum Moldenke, Phytologia 2: 24. August 26, 1941. Verbena lundellorum Moldenke ex A. M. Davis, Study Boscaje Palma Cameron Co. 42 & 61, sphalm. 1942.

Bibliography: Perry, Ann. Mo. Bot. Gard. 20: 315. 1933; L. I. Davis, Nature Leafl. Lower Rio Grande Valley Nature Club 1, pr. 1, [2—3] (1941) and pr. 2, [2—3]. 1941; Moldenke, Phytologia 2: 24. 1941; W. H. Camp, Tax. Ind. 4: item 385. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 18 & 34. 1942; A. M. L. Davis, Study Boscaje Palma Cameron Co. 31, 39, 41—43, & 61, pl. 10, mss. 1942; Moldenke, Alph. List Invalid Names 48. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13 & 101. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Moldenke, Castanea 10: 40. 1945; Moldenke, Phytologia 2: 127 (1945) and 2: 160. 1946; G. L. Fisher, Am. Bot. Exchange List. 1946; Moldenke, Alph. List Cit. 1: 144 (1946) and 2: 518. 1948; Moldenke, Wrightia 1: 229—230. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 70. 1948; Moldenke, Alph. List Cit. 3: 678—681, 723, 764, & 785 (1949) and 4: 1111, 1213, 1218, 1254, & 1291. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 23, 32, & 197. 1949; Moldenke, Phytologia 3: 73. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 262 & 263. 1953; Moldenke, Résumé 28, 39, 369, & 471. 1959; Lewis & Oliver, Am. Journ. Bot. 48: 639—641. 1961.

Illustrations: A. M. L. Davis, Study Boscaje Palma Cameron Co. pl. 10, mss. 1942; Lewis & Oliver, Am. Journ. Bot. 48: 640. 1961.

Sprawling or prostrate perennial herb (when large), sometimes covering an area over 3 m. wide, or bushy upright and to 45 cm. tall (when small); stems decumbent to ascending, slender, branched, obtusely tetragonal, hirsute or rather abundantly hirsutulous with stiff white hairs about 1 mm. long; branches numerous, very slender, erect or ascending, obtusely tetragonal, more densely hirsutulous; principal internodes 4—10 cm. long; leaves decussate-opposite, numerous; petioles slender or very slender, 0.5—2.5 cm. long, hirsute or abundantly hirsutulous like the branches, slightly margined; leaf-blades thin-chartaceous or membranous, somewhat lighter green beneath or else light-green above and slightly gray-green beneath, ovate or ovate-deltoid, 1.1—7 cm. long, 0.7—5.3 cm. wide, acute or subacute at the apex, subtruncate or truncate-cuneate at the base and slightly attenuate or prolonged into the petiole at the center, coarsely and irregularly incised-dentate or serrate-dentate along the margins with blunt or subacute teeth, appressed-hirsute or sparsely scattered-pilose on both surfaces with appressed whitish hairs; inflorescence spicate, abbreviated and 2—6 cm. long during anthesis, densely many-flowered, the flowers closely imbricate before and during anthesis, somewhat more separated in fruit, elongated to

15 cm. in fruit, with few (usually 3 or 4, sometimes to 7) open flowers at any one time; peduncles (0.8--8 cm. long) and rachis very slender or filiform, more acutely tetragonal, hirsute or abundantly hirsutulous like the branches, often with shorter glandular hairs interspersed; bractlets linear-lanceolate or linear-attenuate, 6--8 mm. long, slightly shorter or longer than the calyx, setaceous at the apex, hirsute or densely puberulent, long-ciliate along the margins with stiff white hairs; calyx tubular, swollen, 5--8 mm. long, about 1.5 mm. wide, hirsute or somewhat puberulent and also sparingly hirsutulous with longer white hairs, not glandular; corolla small, inconspicuous, varying from light-purple or purple to rose-purple, lavender, or dark-lavender, barely protruding from the calyx, its tube 7--11 mm. long, the limb 2--8 mm. wide; cocci subcylindric with a broader base, about 3 mm. long, 0.5 mm. wide at the apex and about 1 mm. wide at the base, the commissural face practically reaching the apex, muricately scabrous; chromosome number: n = 15.

The type of this interesting species was collected by L. Irby Davis in a palm grove on the Southmost Plantation, Cameron County, Texas, in April, 1941, and is deposited in the herbarium of the University of Texas at Austin. The type of V. lundelliorum was collected by Cyrus Longworth Lundell and Amelia A. Lundell (no. 8698) -- in whose honor it was named -- in a clearing at the palm grove, south of Brownsville, Cameron County, Texas [in other words, at the same locality!], on May 4, 1940, and is deposited in the Britton Herbarium at the New York Botanical Garden. Lundell 10011 is said to have come from the type colony.

It is rather singular that both binomials proposed for this species should have been published in the same year, and even in the same month, and based on material from the same locality! Careful comparison of publication records, however, shows that Davis' name was actually published and distributed to botanists and botanical libraries twelve days before mine was, so his name must stand as the accepted name for the plant in question. This was pointed out by me in my booklets "The Known Geographic Distribution of the Members of the Verbenaceae and Avicenniaceae", pp. 13 & 101 (march 12, 1942) and "An Alphabetic List of Invalid and Incorrect Scientific Names Proposed in the Verbenaceae and Avicenniaceae", p. 48 (March 14, 1942), and in Phytologia 2: 127 (January 4, 1945) and 160 (July 8, 1946). Anna May Tarrance Davis, in her thesis entitled "A study of Boscaje de la Palma in Cameron County, Texas, and of Sabal texana", pp. 31, 39, 41--43, & 61 (August, 1942), gives valuable additional information about this species and on pl. 10 a splendid illustration of it.

The species has been found by collectors on prairies, along roadsides, in woodlands, fields, and clearings, and on the ground of tennis courts, at altitudes of 20 to 3100 feet, blooming in every month of the year. In Texas it is said that March and April are usually the months of best bloom, and good fruit has been collected in July. In Mexico it has been found in fruit in June,

growing in sticky black non-wooded valley soil. Davis reports that the January and February spikes often look quite unlike the later ones "for they have as many as seven flowers open at one time, making a circle around the central mass of buds. Later elongated spikes have only three or four flowers open at one time. It is presumed that the heat causes the rather delicate corollas to be shed more rapidly." He states further that the species "is quite common in the 'rain forests' on the east slopes of the mountains in eastern San Luis Potosí and has been collected by the writer at Tamazunchale, Tancanhuitz, Xilitla and twenty miles south of Valles. It has also been collected twenty miles west of Arrtiguo Morelos, Tamaulipas in the same range of mountains. The plant is most often found in the shade where it tends to grow rankly with large thin leaves. In the open the plant grows more like V. ciliata and the leaves are smaller and thicker. In Cameron County, Texas one plant, growing in the open, covered an area ten feet across and showed extensive rooting at the nodes."

King calls it an "abundant weed in open sun" and "locally abundant in partial shade" in San Luis Potosí. Traverse describes the plant as growing "along roadsides at palmgroves on banks thrown up in road making, in light brown silt in Sabal texana - Celtis mississippiensis complex", while Cory reports it "frequent on grounds of tourist courts." King found it in fields with abundant weeds in open sun.

The Ecology Class Univ. Texas s.n. cited by me in Lundell, Fl. Texas 3 (1): 36 (1942) as V. delticola Small, as well as the Liebmann 11313 & 11314, Nealley 117 & 118, and Palmer 90 cited by Perry (1933) under that species, are actually V. cameronensis. Herbarium material of V. cameronensis has also been misidentified and distributed as V. aubletia L., V. canadensis (L.) Britton, V. delticola Small, and V. elegans H.B.K. Galeotti 777 is the type collection of V. teucriifolia Mart. & Gal., but the sheet of it photographed by Macbride as his photograph no. 24699 is V. cameronensis; the real type of V. teucriifolia is the sheet with this same number in the herbarium of the Jardin Botanique de l'Etat at Brussels, seen and photographed by me.

In a series of letters to me, Mr. Davis gives quite some information about this plant which probably should be recorded here. First, about the original publication of its name: "Before it was noticed that our Nature Club leaflet describing my pet Verbena contained several errors (one of them rather bad).....some 50 or more.....were mailed out to a first preferred mailing list which was.....made up mostly of friends and a few specialists. A second printing was then made and it is being sent to all those people and institutions interested in botany and of course to those who got the first one...." In the Taxonomic Index for 1941 Camp makes the entirely uncalled for caustic comment that "Because of certain Post Office laws our opinion of such media for the publi-

cation of new species cannot be expressed here."

Davis continues: "Verbena cameronensis is the first new species I ever found and I have delayed describing it for years while I was studying its variations and distribution. It is rather common in parts of Mexico....I have numerous photographs of it growing here and in different places in Mexico (some of these pictures show V. cameronensis growing in mixed beds with other species which thus show the characters most decidedly by contrast with better known species). I have considerable data on geographic and seasonal variation, and also a number of notes on differences with V. delticola to present later. I could not present this voluminous material in the original publication for reason of cost; consequently the rather unique method of publication was used....The 'vine-like' verbenas that occur naturally in Cameron County, Texas may be separated by the following scheme: V. quadrangulata has the corolla limb not more than 1/2 as wide as the calyx is long; V. cameronensis has the corolla limb usually exactly equal to the length of the calyx but may in extreme cases be 3/4 as wide as the calyx is long; and the others (V. ciliata, V. delticola, etc.) have the corolla limb considerably wider than the calyx is long." He goes on to say that the pubescence of V. cameronensis and V. delticola "is almost exactly the same even though the plants are so decidedly different in the field here that it seems impossible that the two could be confused. Except in very young plants the leaves of delticola tend to be much more irregular in outline than those of cameronensis here in Texas -- most plants have a number of leaves that are decidedly three-divided in delticola... This difference will usually enable you to separate the plants without even looking at the blossoms. I find that in certain Mexican states the leaves of delticola become more regular in outline but there are probably enough other characters to readily separate the species. In the field cameronensis and delticola are easily separated by the differences in color or by the difference in appearance of the centers of the heads of the spikes when there are no blooms open...."

In another letter he says "The next big bend of the Rio Grande to the east of the Rabb bend is the Southmost bend. At the lower part of this bend we have the Southmost Plantation where there are also a number of Sabal groves. Although nearly all visitors from the north put in all their time set aside for our Sabal association at the Rabb area (because of its wide publicity I suppose), I think the Southmost area much more interesting. Several tropical plants that do not grow in the Rabb area are found in the Southmost bend. There V. cameronensis is quite common. It was noticed that the description of your V. lundellorum sounded exactly like V. cameronensis except for the flowers which were absurdly small for cameronensis. After studying it carefully my wife and I discussed it and decided it could not possibly be the

same as the corolla limb was only 2 mm. wide in your species. Last April [1941] we had made a study of the variation of cameronensis while on a trip into central Mexico....and found that plants growing very poorly on dry hillsides had corolla limbs of 6--7 mm.; so we felt that it would be impossible to have a corolla less than 6 mm. wide. That will be unfortunate if they really do turn out to be the same species even though yours does have such very small corollas. If they are the same it certainly must be that you have very poor material and insufficient amounts of it to properly study the species....I have been years at working out the details of that species and feel secure about it for all the taxonomists that I carefully sent specimens to always called it 'delticola'! As far as I can find it is the only verbena in certain places in Mexico."

In all, 58 herbarium specimens, including the types of all the names involved, and 9 mounted photographs and descriptions have been examined by me.

Citations: TEXAS: Cameron Co.: Cory 51353 (Ca--754842, Du--345338, N, Sm, W--1885955); L. I. Davis s.n. [Southmost, Spring '41] (Au--121838--type, F--photo of isotype, N--isotype, N--photo of isotype, Si--photo of isotype, Sm--isotype, Z--photo of isotype), s.n. [Southmost, Feb. 1, 1942] (N), s.n. [March 7, 1942] (N), s.n. [Southmost, March 22, 1942] (Gg--295228, Ml, N, W--1828599), s.n. [Bayview, March 3, 1946] (Au--171996); Ecology Class Univ. Texas s.n. [Palm Grove, 3.1.30] (Au--121839); G. L. Fisher 41031 (Au--121837, Gg, S, W--1811794); C. L. Lundell 10771 (N, W--1926934); Lundell & Lundell 8698 (Ld, Mi, Mi, N, N-photo, Z--photo), 10011 (Ld, Mi, Mi, N, W--1888874), 10014 (Ld, Mi, Mi, N, W--1888876); Nealley 117 ["368"] (Up--17081, W--56207), 118 (Up--17081); R. Runyon 1943 (W--1734131); Traverse 1107 (Au--179110, W--2339918). MEXICO: Hidalgo: H. E. Moore 2917 (Ba); A. J. Sharp 441820 (O). Oaxaca: Liebmann 11314 (W--1315840). San Luis Potosí: L. I. Davis 213 (N); R. M. King 3983 (N, Z), 4249 (N); C. L. Lundell 12256 (N, W--1927026); R. L. Oliver 125 (Z); J. N. Weaver 667 (W--2134162), 677 (N). Tamaulipas: L. I. Davis 214 (N); Edw. Palmer 90, in part (Gg--31466, N, W--463027). Vera Cruz: Galeotti 777, in part [Macbride photos 24699] (Kr--photo, N--photo); Liebmann 11313 (W--1315091); Medellin 40 (Me). MOUNTED DESCRIPTIONS: L. I. Davis, Nature Leafl. Lower Rio Grande Valley Nature Club 1: [2--3]. 1941 (Ur); Moldenke, Phytologia 2: 24. 1941 (W).

VERBENA CAMPESTRIS Moldenke, Phytologia 3: 117--118. 1949.

Synonymy: Timotocia chamaedrioides (Cham.) Mold. ex Moldenke, Résumé Suppl. 1: 23, in syn. 1959.

Bibliography: Moldenke, Phytologia 3: 117--118 (1949) and 3: 288. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 110 & 471. 1959;

Moldenke, Résumé Suppl. 1: 23. 1959.

Low herb; stems creeping, very slender, shortly appressed-pubescent; branches procumbent or ascending, very slender, rather obtusely tetragonal, rather sparsely appressed-pubescent; leaves decussate-opposite; petioles very slender, 1--3 mm. long, strigillose; leaf-blades chartaceous, uniformly bright-green on both surfaces, ovate in outline, 5--10 mm. long and wide, obtuse at the apex, acute or subcuneate at the base, 3-lobed with deep sinuses, each lobe rather irregularly incised with obtuse lobules, finely strigillose above and on the venation beneath; midrib, secondaries, and veinlets very slender, often subimpressed above, prominulous beneath; inflorescence terminal, spicate, the florif-erous portion of the spikes dense, subcapitate when young, later elongating to 15 mm.; peduncles filiform, 1--4 cm. long, puberulent; bractlets narrowly elliptic, about 3 mm. long and 1 mm. wide, attenuate at the apex, ciliolate-margined; calyx tubular, about 4 mm. long, 5-angled, 5-costate, 5-apiculate, spreading-ciliolate on the angles; corolla hypocrateriform, blue, its tube about 4 mm. long, strigillose above the calyx, its lobes about 2 mm. long, emarginate at the apex, finely strigillose on the outside.

The type of this very distinct species was collected by Raulino Reitz (no. 2392) on a campo, at an altitude of 2000 meters, at Campos dos Padres, Santa Catarina, Brazil, on December 16, 1948, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been collected in anthesis also in January. Common names recorded for it are "camaradinha", "formosa sem dote", and "jurupeba" -- names, which, however, are applied to most other members of the genus in southern Brazil.

In all, 4 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Santa Catarina: Rambo 60168 (S); Reitz 2392 (N--type), 2505 (N), 2536 (N).

VERBENA CANADENSIS (L.) Britton, Mem. Torrey Bot. Club 5: 276. 1894.

Synonymy: Buchnera canadensis L., Mant. 88. 1767. Verbena aubletia Jacq., Hort. Vindob. 1: pl. 176, and 2: 82. 1772. Obletia Rozier, Introd. Obs. Phys. Hist. Nat. 1: 367, pl. 2. 1773. Verbena oblaetia Retz., Svenska Vet. Akad. Stockh. Nya Handl. 34: 143, pl. 5. 1773. Verbena obletia Medic., Act. Acad. Theod.-Palat. 3 (Phys.): 194, pl. 7. 1775. Anonymos caroliniensis Walt., Fl. Carol. 164. 1788. Verbena longiflora Lam., Tabl. Encycl. Méth. Bot. [Illustr.] 1: 57. 1791. Glandularia caroliniensis J. F. Gmel., Syst. Veg. 2 (2): 920. 1791. Billardiera explanata Moench, Method. 369. 1794. Verbena rubra Salisb., Prodr. 71. 1796. Verbena tetrandra, spicis solitariis; corollis fasciculatis; foliis cordatis, inciso-serratis L. f. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena (aubletia), tetrandra, spicis laxis, solitariis;

foliis trifidis, incisis Ait. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena (aubletia), assurgens, foliis variè dissectis; spicis solitariis, peduncularis, imbricatis, grandifloris Mich. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena (longiflora), spicis solitariis, densiusculis, corollarum laciniis emarginatis; foliis ovalibus inciso-serratis, petiolatis Lam. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Buchnera (canadensis), foliis laciniatus, caule dichotomo L. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena anonyma Bart. ex Raf., Suppl. Fl. Ludovic. 139, in syn. 1817. Verbena aubletia Wild ex Raf., Suppl. Fl. Ludovic. 139. 1817. Glandularia carolinensis J. F. Gmel. apud Raf., Suppl. Fl. Ludovic. 139, in syn. (1817); Steud., Nom. Bot., ed. 1, 873. 1821. Verbena lamberti Sims in Curtis, Bot. Mag. 48: pl. 2200. 1820 [not V. lamberti Ker, 1827, nor Spreng., 1959]. Glandularia obletia Rozier ex Steud., Nom. Bot., ed. 1, 873. 1821. Verbena grandiflora Michx. ex Steud., Nom. Bot., ed. 1, 873, in syn. 1821 [not V. grandiflora Bodger, 1936, nor Ort., 1797, nor Sessé & Moc., 1889]. Verbena intermedia Penny ex G. Don in Loud., Hort. Brit. Suppl. 1: 602. 1832 [not V. intermedia Gill. & Hook., 1829]. Verbena lamberti Penny ex G. Don in Loud., Hort. Brit. Suppl. 1: 602. 1832. Verbena lamberti var. rosea Sweet, Brit. Fl. Gard., ser. 2, 4: 363. 1836. Verbena aubletia var. drummondi Lindl. in Edwards, Bot. Reg. 23: pl. 1925. 1837. Glandularia aubletia (Jacq.) Nutt., Trans. Am. Phil. Soc. 5: 184. 1837. Verbena drummondi Hort. ex Lindl. in Edwards, Bot. Reg. 23: pl. 1925, in syn. 1837. Verbena aubletia drummondi Lindl. ex G. Don in Loud., Hort. Brit. Suppl. 2: 680. 1839. Verbena lamberti rosea D. Don in Loud., Hort. Brit. Suppl. 2: 680. 1839. Verbena drummondii Hort. ex G. Don in Loud., Hort. Brit. Suppl. 2: 680, in syn. 1839 [not V. drummondii Sweet, 1947]. Anonymos carolinensis Walt. apud Walp., Repert. 4: 31, in syn. 1845. Verbena aubletia L. apud Schau. in A. DC., Prodr. 11: 554. 1847. Verbena obletia Retz. apud Schau. in A. DC., Prodr. 11: 554, in syn. 1847. Verbena longifolia Lam. ex Rümpler in Vilm., Illustr. Blumeng., ed. 1, 1259, in syn. 1873 [not V.longifolia Mart. & Gal., 1844]. Verbena montana Hort. ex Sieb. & Voss in Vilmorin, Blumeng., ed. 3, 1: 825, in syn. 1895. Verbena grandiflora Steud. ex Hook. & Jacks., Ind. Kew. 2: 1179, in syn. 1895. Verbena aubletia grandiflora Haage & Schmidt, Cat. Général 93. 1898. Verbena drummondii (Lindl.) Baxt. ex Small, Fl. Southeast. U. S., ed. 1, 1011. 1903. Verbena lambertii Sims ex Small, Fl. Southeast. U. S., ed. 1, 1011. 1903. Verbena canadensis Britton apud Durand & Jacks., Ind. Kew. Suppl. 1: 451. 1906. Verbena aubletia var. lamberti (Sims) M. E. Jones, Contr. West. Bot. 12: 78. 1908. Verbena canadensis var.

lambertii Thell., Fl. Advent. Montpel. 428. 1912. Verbena aubletia drummondii Lindl. ex Stapf, Ind. Lond. 6: 429. 1931. Verbena lambertii rosea D. Don ex Stapf, Ind. Lond. 6: 430. 1931. Verbena aubletia var. lamberti M. E. Jones apud Perry, Ann. Mo. Bot. Gard. 20: 343. 1933. Glandularia lambertii (Sims) Small, Man. Southeast. Fl. 1138 & 1508. 1933. Glandularia canadensis (L.) Small, Man. Southeast. Fl. 1139 & 1508. 1933. Glandularia drummondii (Lindl.) Small, Man. Southeast. Fl. 1139 & 1508. 1933. Verbena canadensis var. drummondii (Lindl.) Baxt. ex Junell, Symb. Bot. Upsal. 4: 11. 1934. Verbena canadensis var. atroviolacea Hort. ex Dermen, Cytologia 7: 161—163, fig. 10, 164, 165, fig. 26, 168, & 174. 1936. Verbena canadensis var. compacta Hort. ex Dermen, Cytologia 7: 161, 164, & 168. 1936. Glandularia drummondii (Hort. ex Baxt.) Small apud A. W. Hill, Ind. Kew. Suppl. 9: 124. 1938. Glandularia lamberti (Sims) Small apud A. W. Hill, Ind. Kew. Suppl. 9: 124. 1938. Verbena bracteosa Pursh ex Moldenke, Prelim. Alph. List Invalid Names 45, in syn. 1940 [not V. bracteosa Michx., 1803]. Anonymos caroliniensis J. F. Gmel. ex Moldenke, Prelim. Alph. List Invalid Names 5, in syn. 1940. Glandularia aubletia Nutt. ex Moldenke, Prelim. Alph. List Invalid Names 26, in syn. 1940. Verbena aublatia Jacq. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena aubletia var. compacta Hort. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena aubletia var. drummondii Lindl. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena aubletia var. grandiflora Hort. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941. Verbena drummondii Baxt. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena drummondii (Lindl.) Bart. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena drummondii var. montana Hort. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941. Verbena canadensis L. ex Moldenke, Alph. List Invalid Names 46, in syn. 1942. Verbena canadensis var. lamberti Thell. ex Moldenke, Alph. List Invalid Names 46, in syn. 1942. Verbena aublettia Roig, Plant. Medic. Cuba 671 & 811, sphalm. 1945. Büchnera canadensis L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 3, in syn. 1947. Glandularia aubletia Gmelin ex Moldenke, Alph. List Invalid Names Suppl. 1: 9, in syn. 1947. Glandularia canadensis XYZ ex Moldenke, Alph. List Invalid Names Suppl. 1: 9, in syn. 1947. Glandularia lamberti Small ex Moldenke, Alph. List Invalid Names Suppl. 1: 10, in syn. 1947. Glandularia obletia Rozier ex Moldenke, Alph. List Invalid Names Suppl. 1: 10, in syn. 1947. Verbena aublattia Roig ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena aubletia Ait. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena aubletia (L.) Britton ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena

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Illustrations: Jacq., Hort. Vindob. 1: pl. 176 (in color).

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Erect or ascending herb of spreading habit, to 60 cm. tall, annual in the northern part of its range, perennial in the southern part; roots fibrous; rhizomes sometimes present; bark green; stems decumbent or ascending, slender, 3--6 dm. long, rooting at the lower nodes, more or less branched, spreading-hirsute or glabrate; leaves very variable in shape, the blades membranous, ovate to elongate-ovate or ovate-oblong, 2.5--9 cm. long, 1.5--4 cm. wide, acute or acuminate at the apex, truncate or cuneate at the base and narrowed into the margined petiole, varying from incised or incised-pinnatifid to 3-cleft, appressed-hirsute or glabrate on both surfaces; spikes pedunculate, fascicle-like or depressed-capitate during anthesis, elongating in fruit; bractlets shorter than or occasionally as long as the calyx, linear-attenuate, hirsute, usually ciliate; flowers fragrant or odor-

less, about 1.3 cm. wide; calyx glandular-hirsute, 10--13 mm. long, its lobes very slender, subulate-setaceous, unequal, the posterior one much shorter; corolla varying from rose, rose-pink, rose-purple, pink, light-pink, light rosy-magenta, or magenta to lavender, bright-lavender, lilac, pinkish-lavender, phlox-lavender, orchid-colored, soft pale blue-violet, reddish-violet, purplish, purple, or blue, sometimes variegated, often lavender or purple with a reddish eye, its tube about twice as long as the calyx, varying from glabrous to finely pubescent or glandular on the outer surface, its limb sometimes orchid-purple (HCC.31), 11-15 mm. wide, the lobes 5, emarginate; anther-connectives with large glands or glandless; schizocarp constricted along the lines of cleavage at maturity; cocci 3--3.5 mm. long, subcylindric with a slightly broadened base, reticulate-scrobiculate from the apex to the base, the commissural faces muricate-scabrous; chromosome number: 2n = 30.

This common species grows from Illinois to Tennessee, southern Pennsylvania, Virginia, and Florida west to Colorado and Texas, and has been naturalized in Michigan and Minnesota, and is widely cultivated. It is a very variable and polymorphic species. Names have been given to various forms, but they do not seem to be sufficiently constant to warrant nomenclatural designation. In the horticultural trade, for instance, plants with dark-violet corollas are know as var. atroviolacea; those with compact habit are var. compacta; those with especially large corollas are var. grandiflora; those with bipinnatifid leaves and the calyx only 10 mm. or less in length are var. drummondii; and those with narrow pinnatifid lanceolate or ovate-lanceolate leaves, cuneate at the base, and the calyx 12 mm. or more in length are var. lamberti (lamberti rosea is said to have paler, fragrant, larger flowers). Typical V. canadensis has pinnatifid broadly ovate to deltoid leaves, cordate or broadly truncate at the base, the calyx 12--13 mm. long. Small differentiates these forms (as species) from their near relatives as follows:

1. Corolla rose-purple, pink, or white.
   2. Leaf-blades toothed, incised, lobed, or pinnatifid, the segments broad.
3. Tip of the longer calyx-lobes subulate, 1 mm. long..... V. maritima.

3a. Tip of the longer calyx-lobes bristle-like, 2--3 mm. long.
   4. Leaf-blades pinnatifid or incised-pinnatifid; cocci 2.5-3 mm. long, stout, pitted from near the base to the apex.
      5. Leaf-blades once pinnatifid; calyx 12 mm. long or longer.
         6. Leaf-blades lanceolate to ovate-lanceolate, cuneate at the base..... V. lambertii.
         6a. Leaf-blades broadly ovate to deltoid, cordate or broadly truncate at the base..... V. canadensis.
      5a. Leaf-blades bipinnatifid; calyx 10 mm. long or less..

V. drummondii.

4a. Leaf-blades serrate or incised-serrate; cocci about 4 mm. long, slender, pitted from about the middle to the apex.....V. tampensis.

2a. Leaf-blades pinnatisect, the segments narrowly linear to subulate.....V. tenuisecta.

1a. Corolla red.....V. peruviana.

Among the numerous common names recorded for V. canadensis are the following: "clump berbena", "clump verbena", "clump vervain", "common verbena", "common wild verbena", "cut-leaves rose vervain", "cut-leaved vervain", "flowering verbena", "Lambert's vervain", "large flowered verbena", "large-flowered verbena", "large flowering verbena", "large flower verbena", "perennial verbena", "pobladora", "pobbeeten", "purple-flowered verbena", "purple verbena", "Rocky Mountain vervain", "rose-coloured vervain", "rosenrotes Eisenkraut", "rose verbena", "rose vervain", "small-flowered verbena" [surely in error!], "sweet William", "verbena", "verbenen", "verbenia", "vervain", "verveine à bouquet", "verveine à bouquets", "verveine citronnelle", "verveine de Drummond", "verveine de Miquelon", "verveine de Miquelon naine magenta", "verveine de Miquelon naine rose", "verveine des Indes", "verveine du Canada", "verveine du Pérou", and "wild verbena". It must be pointed out, however, that the names "verbena" and "vervain" are applied to many other species of the genus -- and to the genus as a whole -- as well as to species of related genera [see under V. bonariensis L.]. Specimens have been misidentified and distributed in herbaria as V. ambrosifolia Rydb., V. angustifolia Michx., V. bipiinnatifida Nutt., V. bipinnatifida Nutt., V. bracteosa Michx., V. chamaedrifolia Juss., V. ciliata Benth., V. denticola Small, V. erinoides Lam., V. halei Small, V. hybrida var. compacta Hort., V. macdougalii Heller, V. officinalis L., V. phlogiflora Cham., V. pumila Rydb., V. stricta Vent., V. tampensis Nash, V. venosa Gill. & Hook., and V. xutha Lehm.

The V. bracteosa x urticifolia of Eggert, of Rydberg, and of Stevens are all xV. perriana Moldenke; V. lamberti Ker is V. elegans H.B.K.; V. lamberti Spreng. is V. lasiostachys Link; V. aubletia var. maritima Curtiss is V. maritima Small; V. aubletia Jacq. x V. tenera Spreng. is xV. wingei Moldenke; and V. canadensis var. ehrenbergii Thell. is V. elegans H.B.K.

Rümpler (1873) calls this plant "Aubletiaartiges Eisenkraut", "verveine de Miquelon", "verveine à bouquets", and "Aubletia-like vervain". His description is "Einjährig.-- Mehr oder weniger steifhaarige, von Grund auf verästelte Pflanze mit vierkantigen, ausgebreiteten, dann aufrechten, 30--50 Centimeter hohen Aesten. Blätter gegenständig, stark genervt, länglich-eirund, halbgefiedert, mit 3 ungleich gezähnten Lappen. Blüthen zahlreich, sitzend, in Anfangs mehr oder weniger dichten und doldenförmigen, dann

verlängerten Aehren; Kelch behaart, röhrig, gegen 1 Centimeter lang, mit 5 kleinen Zähnen und mit einem linienförmigen Beckblättchen; Blumenkrone fast schalenförmig, die cylindrische Röhre länger als der Kelch; Saum eben, dunkel-amaranthrosa, in 5 Lappen getheilt, von denen 3 grüszer; im Schlunde ein kleiner Kranz weiszer Haare; Staubgefäsze 4 odr 5, eingeschlossen; Griffel dünn, ebenfalls von der Röhre eingeschlossen."

He separates on page 1260 var. drummondii Hortorum (which he calls "lilafarbige Abart" as follows: "Unterscheidet sich von der vorigen nur durch ihre violett-lilafarbigen Blumen, welche zu gewissen Stunden des Tages schwach duften."

Of the species he says "Diese Verbene und ihre Abart sind durch den Reichthum und die Dauer ihres Flors ausgezeichnet, welcher in Juni beginnt und je nach der Zeit der Aussaat sich bis zum Oktober verlängert. Sie sind zur Bildung kleiner und groszen Gruppen, zur Ausschmückung der Rabatten, wie auch zur Anlage hübscher Einfassungen sehr beliebt. Man säe sie: -- 1. Im März-April in das Mistbeet, pikire sie in das Mistbeet oder in Töpfe, die man in das Mistbeet zurückstellt, und pflanze sie zum Bleiben im Mai-Juni, oder auch auf das Rservebeet, um sie, wenn sie blühen wollen, mit dem Erdballen auszuheben und an den Platz zu pflanzen. -- 2. Im September auf ein Gartenbeet; man pikire die Pflänzchen in Schalen, die man unter Glasfenstern überwintert und pflanze sie im Mai mit 40--50 Centimeter allseitigem Abstande an den Platz."

The J. B. H. s.n. [Bad Lands, June 1886], Carleton 177, Demaree 12003, Geyer 107, C. S. Sheldon 323, B. B. Smyth 306, L. F. Ward s.n. [Fort Worth, Sept. 9, 1877], and C. Wright 1502, distributed as V. aubletia or V. canadensis, are actually V. bipinnatifida Nutt.; T. S. Brandegee 5, J. M. Coulter s.n. [Denver, May 17, 1873], J. H. Cowen 403 & s.n. [Florence, June 14, 1892], and O. B. Metcalfe 1090 are V. ambrosifolia Rydb.; S. B. Parish s.n. [July 1882] is V. ciliata Benth.; Goldman 42, C. R. Orcutt 1191, Pringle 11843, and Tharp 1826 are V. delticola Small; J. E. Johnson s.n. [s. Utah, 1876], Lemmon & Lemmon s.n. [Peach Springs, June 1884], C. T. Mohr s.n. [Gila River, Feb. Mar. 1873] & s.n. [Plains of Sonora, 20-29-80], Edw. Palmer s.n. [Southern Arizona, 1869], Purpus 6061, and Toumey 305a & s.n. [Grapevine Cañon, July 30, 1891] are all V. gooddingii Briq.; Griffiths 3489, Hough s.n. [Sabina Cañon, April 4, 1896], Edw. Palmer 307, C. C. Parry 551 (in part), M. E. Spencer 92, Toumey s.n. [Camp Verde, Aug. 7, 1891] & s.n. [Sabina Cañon, April 4, 1896], and G. R. Vasey s.n. [Tucson, 1881] are all V. gooddingii var. nepetifolia Tidestr.; and Parry, Wright, & Schott s.n. [Frontera, Mar. 22, 1852] is a cotype collection of V. wrightii A. Gray, while A. Baker 20, H. Manning 33, and S. Taylor 27 are V. tenuisecta Briq.; J. I. Carlson s.n. [Douglas, May 13, 1915] is V. ciliata Benth. or V. ambrosifolia f. eglandulosa Perry; Liebmann 11313 & 11314 and Nealley 117 are V. cameronensis L. I. Davis; Tharp 5602 is V. ciliata

var. longidentata Perry; E. J. Palmer 11843 is V. pumila Rydb.; C. Thomas s.n. [Colorado Terr., 1869] is in part V. bracteata Lag. & Rodr. and in part V. ambrosifolia Rydb.; Collector undesignated s.n. [Partridge Creek, April 26] is in part V. gooddingii Briq. and in part V. ciliata var. pubera (Greene) Perry; and C. H. M. Barrett 13, Beckwith 772, and Mattern & Mattern s.n. [Titusville, March 31, 1914] are V. tampensis Nash.

Four hybrids involving this species are known thus far: V. canadensis crossed with V. ambrosifolia f. eglandulosa Perry is xV. fecunda Moldenke, crossed with V. bipinnatifida Nutt. is xV. oklahomensis Moldenke, crossed with V. racemosa Eggert is xV. ferax Moldenke, and crossed with V. tenuisecta Briq. is xV. wingei Moldenke. I regard the V. canadensis var. compacta x ambrosifolia f. eglandulosa Derman and the V. canadensis var. atroviolacea x ambrosifolia f. eglandulosa Dermen as xV. fecunda, too, and the V. canadensis var. compacta x racemosa Dermen and the V. canadensis var. atroviolacea x racemosa Dermen as xV. ferax. The V. canadensis var. candidissima Haage & Schmidt is treated by me under V. canadensis f. candidissima (Haage & Schmidt) Palmer & Steyerm., which see.

Bartram (1791) found V. canadensis at Pointe Coupée, Louisiana, and describes it on page 436 (not "136" as stated by Rafinesque, Suppl. Fl. Ludovic. 139. 1817) of his "Travels" as follows: "here is likewise a new and beautiful species of Verbena, with decumbent branches and lacerated deep green leaves; the branches terminate with corymbi of Violet blue flowers, this pretty plant grows in old fields where there is good soil" and blooms in Autumn.

The species was introduced into cultivation in or about 1770. It has been found growing at altitudes of 30 to 2800 feet, blooming from January to October, and fruiting from February to October. It has been found by collectors in deep sand, sandy loam, heavy loam, Carrizo sand, clay loam, limestone and gravelly limestone, red clay, red sand, and sandy or loam soil in general, in dry drained land and rocky ground, on dry or open prairies, sand hills, granite outcrops, dry shale bluffs, and rocky cliffs and ridges, in old or open and waste fields, rocky or cedar barrens, limestone quarries, and cultivated or sandy abandoned fields, on low wooded or rocky clay hills, in cedar and open cedar glades, on dry banks and knolls, limestone barrens and hillsides and open slopes, in wet meadows and gravel clay soil, on sandy or rocky dry ridges, along railroad tracks and railroad embankments, in rich or moist sandy woods and oak-elm woods, in open and dry open or sandy open ground, on novaculate ridges and high hills or bottoms, in valley land or gravel-clay soil, on ridges and bluffs, dry fertile ridges, or rocky clay soil, along log train tracks, on rocky-sandy banks or roadside ditch banks, in orange groves and sandy woodlands, on low hills,

dunes, and limestone ridges or hills and bluffs, limestone thickets and quarries, along roadsides and roadside ditches, at the edges of fields and prairie pastures, in grasslands and hammocks, along sloughs, in stubble fields and rocky woods, on open banks and nepheline syenite, in yards and sterile oak thickets, in dry bottoms and upland pinelands, in waste places and clay barrens, in sandy or moist sandy woods and sandy post oak woods, at the borders of woods, on forested hillsides and rocky open hillsides, as well as in wet swaley meadowy glades, sandy or sandstone slopes, cut-over pine-oak woods, and deep moist sandy woods. It is said to be abundant on prairies, in fields, thickets, woods, and pinelands, open woods and cultivated ground, along rich clayey and sandy clay or clay-loam roadsides, on sandy hills, in hillside woods, on dry ridges or dry rocky and sandy ridges, on rocky hillsides and rocky fertile hillsides, in meadows and dry waste land, on low wooded hills and igneous intrusive areas, in rocky woods and cleared thickets, in bogs and cemeteries, on rocky mountain and open sunny slopes, in open dry pastures, in gravel soil or fine sandy loam soil and dry upland soil, on floodplains and roadside clay banks, in pastures and fallow open gravelly fields, on dry sterile banks in oak-hickory woods, in the dry soil of cemeteries, on low ridges and dry rocky hills, and in the foothills. Chase calls it a "weed" in cornfields in Illinois, while Jones (1945) says that it grows in open woods from Menard County southward, blooming from May to August there. Doellinger, Moore, & Barkley found it "on Boone limestone, Eureka formation". In Kansas Hale says it grows along roadsides and in rocky places, while Bailey & Bailey refer to it as "common and showy" there. Houghton found it to be "common in open forest" in Oklahoma, while Faulkner says it inhabits "grassland pastures and woods" there. Fox reports that in Louisiana it is found in "mixed forests, open places in woods, and along roadsides", while Ewan says it is "locally frequent in swampy woods" there.

Gates (1940), in his "Flora of Kansas", states that it is found in "prairies, fields and rocky hillsides" mostly in the eastern third of the state, but also at scattered locations in the west. He calls it a hemicryptophyte. Mackenzie affirms that it is common in the barrens of Missouri. Runyon states that it is "abundant in Cameron County [Texas]; it covers large areas of open ground and fields; flowers in terminal panicles; leaves dissected into many lobes; fruit a cylindric capsule." His no. 2625 has flowers rather small for this species -- he describes its leaves as "nearly trifid, ovate in outline" and says it is "occasional along the highway in Hidalgo County." Rose-Innes & Warnock state that the species grows in "disturbed sandy soil along roadsides" in Texas, while Furlong describes it as "occasional in sandy roadsides" and Marsh reports it "common in woods under trees" there. In Oklahoma it was found by Hopkins in a "dry sterile field in clearing of oak-hickory forest", while Waterfall found it "in clay and shale in crevasses of mountainside" and "in sand at edge of post oak woods". Godfrey says that it inhabits grassy strips

along open fencerows, grassy open bottomlands, and pine woodlands in Florida. In Iowa it grows among viney pea, wood-sorrel, and violets according to West, while in Alabama it is said by Cooley and the Harpers to be "not common on steep bluffs". Huss found it in sand in the "little bluestem association" in Texas.

The type of V. aubletia grandiflora is Haage & Schmidt 5917, collected in cultivation at Erfurt, Germany, in 1898 or earlier.

The Deam 24736 and Ek s.n. [October 3, 1936], from Indiana, are both said to be "escaped from cemeteries", and Gates 13773, from Cheboygan County, Michigan, has a note on the label stating that it was "apparently escaped from cultivation". Schnack reports that "this verbena is common along the track from St. Louis to Galveston", but his April 13, 1880, collection was "escaped from front yard" in Wabash County, Illinois. Davis & Davis report that it is "a hardy creeping rockgarden verbena bought as V. venosa" and cultivated at Morgantown, West Virginia. It apparently escapes from cultivation in other countries, too, because Gibbes found it on "hills n.e. of Hamburg", Germany, and Beauregard reports it "in cult. fields" in France. Hegi (1927) says "verwildert in der Mark Brandenburg unweit Nauen." Jansson's collection from Connecticut, apparently from escaped material, bears a note "native in the southwestern states."

The L. H. Bailey s.n. [Sept. 30, 1926] bears a notation on its label stating "gland on back, anthers appendaged", but Churchill s.n., according to Bailey, has them "not appendaged". Lawrence reports that his P.584 has "anther connectives without gland."

MacDougal (1907) suggests that V. canadensis may hybridize in the wild with V. bracteata Lag. & Rodr., but he cites no examples, gives no description of the supposed hybrid, and does not say that he actually saw any such hybrid plants. Britton & Brown (1898 and 1913) make the same statement as a fact, but there are no such hybrid specimens in the Britton Herbarium at the New York Botanical Garden. I doubt very much whether these two species ever hybridize with each other, and certainly have never seen any specimens which could be regarded as such a hybrid.

Tharp s.n. [June 6, 1932] has massive inflorescences and the flowers exceptionally large. McBryde s.n. [5/15/31] is also anomalous in having large, thick, shallowly incised leaves, reminding one of V. tampensis Nash. The L. H. Bailey s.n. collections of June 30, 1919, July 4, 1919, July 23, 1925, August 7, 1925, July 22, 1926, August 15, 1926, September 8, 1926, and October 8, 1926, also have the leaves especially large and only shallowly lobed. Tracy 8707 looks somewhat like V. delticola, but apparently is not that species. Burk s.n. [Girard Point] is a mixture with V. bracteata, Palmer 11979 is a mixture with Agrimonia striata Michx., and Demaree 17004 is a mixture with Galium aparine L. The Everett & Quinn s.n. [N. Y. Bot. Gard. Cult. Plants R.41-36] is called the "red form" on its label, while Quinn s.n. [N. Y. Bot.

Gard. Cult. Plants R.38/36] is the "purple form". The Herb. Calif. Acad. Sci. 31446 does not actually say "cultivated" on its label, but I assume that it represents cultivated material. Croom s.n., from Florida, distributed as V. canadensis, is actually Phlox pilosa var. virens (Michx.) Wherry in the Polemoniaceae, while A. S. Hitchcock s.n. [Fowler, July 1, 1892], also distributed as this species, is Chamaesaracha conioides (Moric.) Britton in the Solanaceae. The verbenaceous portion of Demaree 17004 is anomalous -- it looks like a cross with V. bipinnatifida Nutt., but its corollas are smooth (not hairy, as in xV. oklahomensis Moldenke). Van Vleet s.n. [Mt. Sheridan, 7/4/03], however, is apparently a mixture with xV. oklahomensis. The parents of this hybrid were probably growing in close proximity to it, accounting for the mixture. Cain (1944) notes that from xV. wingei Moldenke (which is the cross between V. canadensis and V. tenuisecta Briq.) "it is possible to segregate both parents in pure form."

R. W. Pohl, in a letter to me dated December 27, 1951, says of V. canadensis: it "is found in this vicinity [Ames, Iowa] either as an escape or occasionally cultivated. It is very attractive and almost everblooming, and withstands the most outrageous soil conditions." The label on Winterringer 5331 bears this notation: "evidently trash had been dumped here". Hibbard 87 was first identified as V. bipinnatifida, then as V. bracteata, and finally as V. canadensis. Hitchcock & Stanford 6782 is very doubtfully this species.

V. canadensis was recorded by me in my "Known Geographic Distribution", edition 1, page 14 (1942) from Pima County, Arizona, but this record was based on Stiffler s.n. [1925] in the Cornell University herbarium, which has since proved to be V. gooddingii var. nepetifolia Tidestr.

The Edw. Palmer 247, cited below from Garvin County, Oklahoma, may actually have been from Atoka or Johnston Counties according to McVaugh (1956) who indicates that Torrey included Palmer's original nos. 260 and 390 in his "247" -- 260 was collected in Garvin County on June 11, while 390 was collected on July 1-either in Atoka or in Johnston County.

It is perhaps worth noting here that the specific epithet of this species is very often written with a capital initial letter, but this practice has no basis in Latin grammar nor justification under the present rules of nomenclature. Demaree apparently always writes the name of Hor Spring County, Arkansas, as "Hot Springs County". Bauer (1954) records V. canadensis from Fountain County, Indiana; Hebert (1934) from Berrien County, Michigan; Roads (1928) from Pike County, Ohio; Fernald (1936) from Princess Anne County, Virginia; C. N. Jones (1942) from Darke County, Ohio; and Deam, Yuncker, & Friesner (1952) from Blackford and Delaware Counties, Indiana. As yet I have seen no material from

these counties, but have no reason to doubt their records.

The reference to Loud., Hort. Brit. Suppl. 2: 680 (1839), given in the bibliography of this species, is often credited to W. Baxter, but apparently in error. The "Verbena grandiflora Ort." of Dermen, Cytologia 7: 161--163, fig. 7 (1936) is apparently an error for V. grandiflora Michx., since Ortega's name applies to a species of Priva that would hardly have been mistaken for a Verbena by Dermen.

Verbena canadensis is often attacked by the fungi Dicaeoma verbenicola Arth., Erysiphe cichoracearum DC., and Septoria verbenae Rob.

In the Linnean Herbarium, sheet number 7, under Buchnera, is labeled "Buchnera canadensis" in Linnaeus' own handwriting, while a note in pencil in Smith's handwriting says "V. Aubletia J. E. S." Sheet number 8 under Buchnera is labeled "obletia" in Linnaeus' handwriting and bears a supplementary note "Touretta" and an unidentified plate, with figures 1 to 7, pasted on it. Jackson does not know the source of this plate. The specimens in both cases are definitely Verbena canadensis. Schauer in A. DC., Prodr. 11: 554 (1847) credits the name Verbena aubletia to Linnaeus, but Linnaeus in the reference to which Schauer refers, Suppl. 86--87 (1781), plainly credits it to "Jacqu. hort. v. 2. p. 82. t. 176." It is interesting to note that at the end of his treatment of this species he says "Erinus peruvianus an hujus varietas?" Poiret (1808) cites Obletia Rozier, which he includes here, to "Journ. d'Hist. Nat. (1771)".

Verbena intermedia Penny is listed in the "Index Kewensis" with an "x", indicating hybrid origin. It is said by Don to be "intermediate between V. aubletia and V. lamberti Penny", but he certainly does not claim hybrid origin for it! The name Verbena drummondii Hort. is cited by me in Lundell, Fl. Texas 3 (1): 36, in syn. (1942), to "G. Don in Loud., Hort. Brit. Suppl. 2: 680. 1839", but the "Index Kewensis" affirms that W. Baxter was responsible for it there. The original description of V. aubletia var. drummondi Lindl. is simply "floribus lilacinis suaveolentibus."

Seed of V. canadensis is handled by many dealers, including Borsch, Cronamere, Poughkeepsie, Stumpp & Walter, Breck, and Weston, as well as Wayside Gardens of Mentor, Ohio, Gardenside Nurseries of Shelburne, Vermont, and W. H. Simpson of Birmingham, England. Vilmorin-Andrieux & Cie., in Paris, offer the drummondii form; Huntington offers grandiflora; Schling offers compacta; Sutton offers drummondii; while Haage & Schmidt in Erfurt, Germany offer atroviolacea, compacta, drummondii, and montana.

Vilmorin-Andrieux give the following cultural directions on their seed packets: "Semer: 1° en auot-septembre en pépinière, en pots ou en terrines; repiquer en pots; hiverner sous châssis ou en sierre tempérée au pius pres de la lumiere; mettre en place en

fin avril-mai. -- 2° en mars-avril sur couche; repiquer en pépinière ou en pots, sur couche; mettre en place en mai (ou mai-juin). -- 3° en avril-mai en place ou en pépinière. -- Fl. de juin-juillet en octobre." The species has been in cultivation in England since at least 1799 according to Murray (1799).

Roig (1953) says: "La Verbena canadensis Britton, es muy empleada en los jardines para cubrir los canteros a manera de alfombros, y por la rapidez con se extiende y cubre el suela muchos la denominan POBLADORA....En Santiago de las Vegas, y en otros pueblas de la provincia de La Habana.....cultivada como ornamental en los jardines. Tiene las flores en umbelas de diversos colores." I have never seen any Cuban material of this species and am fairly certain that the plant referred to by Roig is xV. hybrida Voss.

Palmer (1916) cites his nos. 304 and 559 from Jasper County, Missouri. In his 1935 publication he says that the species inhabits "Prairies, fields, glades, and rocky slopes. Calciphile to circumneutral. General, but commonest in central and southern Mo." Schauer (1847) cites a Lindheimer s.n. from Texas, Douglas s.n. from Louisiana, Frank s.n. from Ohio, and Beyrich s.n., Fraser s.n., and Walter s.n. from "Carolina", all deposited in the Berlin and DeCandolle herbaria. He says "Forma vel varietas major, speciosior est V. Aubl. var. Drummondi Lindl.!....Planta ornamentaria hortis europaeis familiaris, ad affinibus foliis minus dissectis discernenda." Walpers (1845) classifies it in his Sect. Verbenaca, Subsect. Inermes, Group Foliosae, Subgroup Macranthae, and Secondary Subgroup Aubletia with ten other species. Schauer places it in his Sect. Glandularia.

Perry (1933) cites the following 104 additional specimens not as yet seen by me: NORTH CAROLINA: Vance Co.: Sturtevant s.n. [Kittrell, 11 April 1889] (E). SOUTH CAROLINA: Abbeville Co.: Hexamer & Maier s.n. [Abbeville District] (G). GEORGIA: County undetermined: Rugel s.n. [lower Georgia and middle Florida] (E). IOWA: Pottawattamie Co.: G. R. Vasey s.n. [Council Bluffs] (G). KENTUCKY: Shelby Co.: Flint s.n. [Shelbyville] (G). TENNESSEE: Rutherford Co.: Eggert s.n. [4 May 1898] (E). KANSAS: Cherokee Co.: A. S. Hitchcock 790 (E, G). Miami Co.: Rydberg & Imler 22 (E). MISSOURI: Barry Co.: E. J. Palmer 29804 (E). Carter Co.: B. F. Bush 318 (E). Henry Co.: A. S. Hitchcock s.n. [Windsor Springs, 30 May 1890] (E). Iron Co.: Drushel 2762 (E); Engelmann s.n. [Pilot Knob Creek, 9 Sept. 1859] (E), s.n. [Pilob Knob Creek, July 1867] (E); C. C. Epling 6134 (E); Greenman 3870 (E), 4076 (E). Jackson Co.: Broadbent s.n. [28 March 1864] (E); B. F. Bush 283 (E, G), 1933 (E), 2901 (E, G), 4922 (E), 6439 (E); Tindall s.n. [Independence, 1 June 1895] (E); Trelease 1161 (E). Jasper Co.: B. F. Bush s.n. [16 Aug. 1893] (E); E. J. Palmer 304 (E), 559 (E), 2996 (E). Jefferson Co.: Drushel 3659 (E); Eggert s.n. [Crystal City, 19 Aug. 1886] (E), s.n. [Crystal City, 6 May 1891]

(E, E); A. S. Hitchcock s.n. [Victoria, 10 May 1890] (E); Johnson s.n. [Kimmswick, 30 April 1905] (E); F. Wislizenus 285 (E). Madison Co.: Greenman s.n. [Mine La Motta, 19 May 1927] (E), s.n. [near Silvermine, 20 May 1927] (E). Phelps Co.: J. H. Kellogg s.n. [Jerome, 5 April 1914] (E). Saint Francois Co.: Trelease 714 (E). Shannon Co.: B. F. Bush 1168 (E). Stone Co.: E. J. Palmer 5682 (E), 24616 (E). Taney Co.: B. F. Bush 569 (E). Washington Co.: J. H. Kellogg 1958 (E). Saint Louis: Eggert s.n. [Allenton, 27 April 1887] (E), s.n. [16 May 1879] (E); Engelmann 334 (E); Sherff 333 (G). County undetermined: Eggert s.n. [Silica, 18 April 1896] (E); Greenman 4231 [Shot Hill, near Selma, 30 May 1923] (E). ARKANSAS: Carroll Co.: E. J. Palmer 29333 (E, G); Trelease s.n. [Eureka Springs, 19 April 1899] (E). Garland Co.: Trelease s.n. [Hot Springs, 31 Oct. 1899] (E). Hempstead Co.: E. J. Palmer 5407 (E). Hot Spring Co.: Letterman s.n. [Malvern] (E). Nevada Co.: B. F. Bush 545 (E). Sebastian Co.: Benke 4566 (G). County undetermined: Pitchard s.n. [Red River] (G). LOUISIANA: Avoyelles Par.: Hale s.n. (G). Cameron Par.: S. M. Tracy 8707 (E, G, N). East Feliciana Par.: Drummond s.n. [Jacksonville] (G). Natchitoches Par.: E. J. Palmer 7001 (E), 7071 (E). Webster Par.: Trelease s.n. [Minden, 15 April 1901] (E). COLORADO: County undetermined: G. R. Vasey s.n. [Rocky Mountains, lat. 40-51', 1868] (E, G). OKLAHOMA: Cleveland Co.: Emig 415 (E). Creek Co.: B. F. Bush 437 (E, G). Garvin Co.: G. W. Stevens 109 (E, G). LeFlore Co.: Blakeley 1471 (G). McCurtain Co.: Houghton 3643 (E, G). Muskogee Co.: E. J. Palmer 14283 (E). Ottawa Co.: G. W. Stevens 2340 (E, G). Payne Co.: Waugh 168 (E). TEXAS: Bowie Co.: Eggert s.n. [T. & C. Junction, 5 Sept. 1900] (E, G). Dallas Co.: Reverchon 740 (E), 2533 (E), s.n. [Dallas] (G). Galveston Co.: Van Huff s.n. [Galveston] (E). Grayson Co.: Reverchon s.n. [Denison, 15 March 1904] (E), s.n. [Denison, 22 April 1904] (E). Gregg Co.: Eggert s.n. [Longview, 21 April 1915] (E); E. J. Palmer 7124 (E). Harris Co.: G. L. Fisher 707 (W), s.n. [Houston] (E); E. Hall 435 (E); Lindheimer s.n. [Houston, Feb. 1842] (G). Houston Co.: E. J. Palmer 12056 (E); Tharp 838 (G). Liberty Co.: E. J. Palmer 11979 (E). Montgomery Co.: E. J. Palmer 33319 (E, G). Polk Co.: E. J. Palmer 5185 (E). She comments that "Verbena canadensis is one of the most easily recognized of the North American species belonging to the section Glandularia. It has a large corolla with the tube about twice as long as the calyx and, at maturity, an elongated spike with somewhat remote fruits and conspicuous calyx-teeth. The leaves are variously lobed or cleft. Although these variations have been used at sundry times to segregate species, they do not seem to be constant nor are they supported by definite geographic ranges, hence scarcely merit

recognition." The G. L. Fisher 707 which she cites is doubtless a typographic error for his no. 1707, cited below.

In all, 1183 herbarium specimens, including type material of most of the names involved, and 22 mounted photographs and illustrations have been examined by me.

Citations: CONNECTICUT: New London Co.: Jansson s.n. [East Lyme, July 8, 1931] (Go). NEW YORK: Suffolk Co.: John Jones s.n. [Bay Shore, May 4, 1951] (N). PENNSYLVANIA: Lancaster Co.: Tanger s.n. [June 4, 1938] (Up). Philadelphia Co.: I. Burk s.n. [Girard Point] (Up--17095). Washington Co.: Shafer s.n. [July 8, 1907] (Cm). VIRGINIA: James City Co.: Eggleston s.n. [Jamestown-Williamsburg, May 16-18, 1907] (Dt). County undetermined: Herb. Wallberg s.n. [1808] (Lu); Stebbins s.n. [Virgin.] (T). WEST VIRGINIA: Lewis Co.: West Va. Univ. Bot. Exped. 1651 (We, We). NORTH CAROLINA: Alamance Co.: Ahles & Bell 16928 (Hi--92858); Radford 10144 (Hi--92858). Brunswick Co.: C. R. Bell 11601 (Hi--121527). Cumberland Co.: M. G. Brooks s.n. [Fayetteville, April 7, 1940] (We). Orange Co.: F. Faust s.n. [10/25/37] (Hi--59470). Randolph Co.: Collector undesignated s.n. [June 30, 1891] (Hi--59460). Rutherford Co.: C. R. Bell 2109 (Hi--92956). Washington Co.: Radford 35194 (Hi--104886). SOUTH CAROLINA: Abbeville Co.: O. M. Freeman 5771 (Hi--92955); F. M. Hexamer 289 (Br); Radford 20026 (Hi--92954). Charleston Co.: K. Hunt 356a (It). Jasper Co.: Ahles & Haesloop 22295 (Hi--92851). McCormick Co.: Radford 20175 (Hi--92854). Orangeburg Co.: Ahles & Haesloop 21682 (Hi--146196). Spartanburg Co.: C. R. Bell 5696 (Hi--92957). GEORGIA: Clarke Co.: Barfield s.n. [May 8, 1917] (Gu--E.1042); Cleckler s.n. [April 10, 1917] (Gu--E.1041); K. M. Drewry s.n. [Apr. 16, 1929] (Gu--E.8541); Elrod s.n. [May 3, 1917] (Gu--E.1046); F. C. Garrett s.n. [May 3, 1917] (Gu--E.1043); C. B. Ingram s.n. [April 30, 1917] (Gu--E.1039); Miller & Maguire 1256 (Ba, Ua--16572), 1257 (Ua--16573), 1258 (Ba, Ua--16574); Palfrey s.n. [April 15, 1917] (Gu--E.1045); Pyron s.n. [Simpton's Bridge] (H--1652); J. M. Reade s.n. [April 22, 1911] (Gu--11746), s.n. [May 8, 1911] (Gu--E.1616); Thornton s.n. [May 3, 1917] (Gu--E.1040); A. C. Welch s.n. [May 13, 1917] (Gu--E.1047); Woodard s.n. [May 7, 1917] (Gu--11747). Dougherty Co.: Thorne & Muenscher 2475 (Ca--906198, N, Vi, W--1929830), 9198 (Vi). Hancock Co.: F. J. Hermann 10149 (N). Jackson Co.: Clausen & Trapido 3802 (Ba, N). Putnam Co.: Cronquist 4238 (Ca--789071, Gu--28028, N, Tl, W--1927967); W. H. Duncan 4900 (N); Pyron & McVaugh 2396 (Gu--16648, H--52338). Randolph Co.: Thorne & Muenscher 7790 (Gu--30795). Richmond Co.: Cuthbert s.n. [Augusta, May 1897] (Fl--21104); L. DeWitte s.n. [Augusta, 1838] (M). Sumter Co.: Huger s.n. [Americus, Apr. 1897] (C); Lawrence & Moore 672 (Go). FLORIDA: Alachua Co.: Murrill 41 (W--

1846518), 421 (W--1928243), 422 (W--1928244); Van Hyning s.n. [April 3, 1924] (Ob--50811), s.n. [May 2, 1924] (Ob--50763); G. F. Weber s.n. [Gainesville, 4-1-28] (Fl--20973, Fl--20974). Brevard Co.: A. A. Baldwin 70 (Up--17080). Broward Co.: G. L. Bates s.n. [Heath, Feb. 26, 1889] (Ur). Columbia Co.: Rolfs s.n. [Lake City, May 1893] (Fl--21133). Dixie Co.: Hume & West s.n. [Oldtown, 29 March 1936] (Fl--11466, Fl--20970). Duval Co.: T. Drummond s.n. [Jacksonville, 1833] (S); G. H. M. Lawrence 193 (N); Lighthipe 599 (N). Flagler Co.: E. West s.n. [Flagler Beach, 9-2-27] (Fl--20985); West & Arnold s.n. [Flagler Beach, 18 April 1940] (Fl--32354). Gadsden Co.: Alden s.n. [Fort King] (T). Highlands Co.: Brass 15267 (W--2065454). Jefferson Co.: R. K. Godfrey 54436 (Hi--155081, N); Lighthipe s.n. [Monticello, March 13, 1891] (Ur). Lee Co.: E. C. Marquand s.n. [March 4, 1930] (N). Leon Co.: R. K. Godfrey 54432 (Hi--155443, N). Marion Co.: J. D. Smith s.n. [Ocala, April 4, '79] (W--1323044). Saint Johns Co.: J. D. Smith 475 (W--1323047), s.n. [Mous Creek, April 15, '79] (W--1323046). Suwannee Co.: Exploration Party 1939 s.n. [17 Mar. 1939] (Fl--30166). Volusia Co.: Berkimer s.n. [Daytona, 3--22-'25] (Vt); S. A. Deam 1831 (Ur, W--753721); G. B. Grant 3063 (Po, Po--267663); A. S. Marsh s.n. [Deland, 1923] (W--1220068); B. H. Patterson s.n. [Daytona, Feb. 23, 1918] (Cm). County undetermined: Herb. Chapman s.n. [Florida] (C). ALABAMA: Jefferson Co.: Cooley, Harper, & Harper 4471 (Tl); Harper & Morgan s.n. [March 22, 1941] (I). Madison Co.: R. M. Harper 3958 (N, W--1899147). Tuscaloosa Co.: Clausen & Clausen 5753 (N); R. M. Harper 3018 (Ba, Mi, N); E. A. Smith s.n. [Tuscaloosa, May 8, 1875] (W--876844); L. F. Ward s.n. [5 mi. above Tuscaloosa, April 11, 1892] (W--147558), s.n. [Tuscaloosa, April 1892] (Au--184936, W--255840). Wilcox Co.: Buckley s.n. [May 1840] (T), s.n. [May] (W--771877). County undetermined: R. C. Alexander s.n. [May 1841] (Ca--379994), s.n. [Sept. 1841] (Ca--379994); Buckley s.n. [May 1840] (Br), s.n. (Io--15339, Pr); Rugel s.n. [ad vias et in incultis arenosis, per Alabamam mediam, Sept. 1843] (W--2188142). MISSISSIPPI: Adams Co.: W. H. Rhoades s.n. [near Natches, July 1931] (N), s.n. [near Natches] (Hs). Jefferson Co.: McDougall 1293 (W--1925707). Oktibbeha Co.: S. M. Tracy 1659 (W). Pearl River Co.: Ashe s.n. [Apl. 18, 1931] (I). Pike Co.: F. S. Earle s.n. [McComb City, April 3, 1878] (Cm). County undetermined: Collector undesignated s.n. (N). OHIO: Clermont Co.: E. L. Braun s.n. [Milford, 5/4/12] (Cn), s.n. [Miamiville, 5/23/17] (Cn, Cn). Hamilton Co.: Aiken s.n. [May 13, 1905] (Po--267628); C. G. Lloyd s.n. [IV-23-05] (Ll). ILLINOIS: Adams Co.: Brinker 3379 (Il--15854, Ur). Champaign Co.: Honeus s.n. [May 20, 1892] (Ur); L. A. MacGregor s.n.

[May 25, 1892] (Ur); Schwickrath s.n. [July 11, 1955] (Ur); Slimmer 33 (Ur). Cumberland Co.: Winterringer 5331 (Il--31872). Kane Co.: Springer s.n. [September 6, 1955] (Ur). Lawrence Co.: Sivert s.n. [May 8, 1949] (Ur). Menard Co.: E. Hall s.n. [1861] (Ur, W--1070016, W--1201443), s.n. [Athens, June 1866] (Ms). Peoria Co.: V. H. Chase 8710 (Ur), 14497 (Ur). Shelby Co.: G. D. Fuller 12713 (Il--19209, Il--19210). Union Co.: Ahles 3630 (Ur); F. S. Earle s.n. [Pine Hills] (Ur); G. D. Fuller 11630 (Il--19098, Il--19099, Il--19100); Winterringer 7059 (Il--35164). Vermilion Co.: R. Bell s.n. [June 9, 1948] (Ur). Wabash Co.: Schneck s.n. [April 13, 1880] (Ur), s.n. [May 1900] (Ur), s.n. [May 14, 1904] (Ur); Shearer s.n. [May 15, 1920] (Vi). INDIANA: Brown Co.: Lipps s.n. [June 14, 1942] (Ok). Clark Co.: J. F. Baird s.n. [8-4-78] (Mi). Howard Co.: Ek s.n. [near Greentown, 6-23-1936] (Bt--42530), s.n. [October 3, 1936] (Dm). Jennings Co.: C. C. Deam 24736 (Dm). Monroe Co.: Blatchley s.n. [May 7, 1887] (Dp). Orange Co.: Friesner 22735 (B). Putnam Co.: Yuncker 1380 (Dp). Wayne Co.: Creek s.n. [Nutter's cem., 8/4] (Ea). IOWA: Story Co.: W. W. Thompson s.n. [8 June 1951] (N); J. W. West s.n. [June 4, 1951] (Gg--406217). KENTUCKY: Edmondson Co.: Lix 363 (W--1948018). Fayette Co.: Didlake s.n. [Lexington, July 15, 1909] (W--592232). TENNESSEE: Davidson Co.: Dermon 12 (Hi--192179); G. W. Hubbard 1963 (Cm, In--9679, Ka, Vt); C. S. Williamson s.n. [Nashville] (N). Montgomery Co.: T. L. Andrews 151 (Io--32955). Rutherford Co.: Eggert s.n. [4 May 1898] (N); Gattinger s.n. [Cedar Glades] (Du--90902); Mortimer 38 (W--1814449); Quarterman 1638 (Va); Sharp & Shanks 439 [Herb. South. Appal. Bot. Club 110 & II.149] (Au, Au, Bt--65318, Dt, Gg--310876, I, N, N, N, Ok, Or--46592, Pl--153778, St--23810, We). Wilson Co.: C. C. Deam 61270 (Dm, N), 61351 (Dm); R. McVaugh 5560 (Ca--724961); F. H. Sargent 6119 (St). County undetermined: Gattinger s.n. [Cedarbottom, June '79] (Vt), s.n. [Middle Tenn., Aug. 1879] (Cm), s.n. [Cedar barrens] (Al). MICHIGAN: Cheboygan Co.: F. C. Gates 13773 (Ka--67941). Genesee Co.: Eggleston s.n. [Flint, 5-9-79] (Dt). MINNESOTA: Ramsey Co.: Eggert s.n. [St. Paul, 16 Mai 1879] (N). KANSAS: Anderson Co.: A. S. Hitchcock s.n. [Anderson Co., July 1896] (Ka); W. H. Horr s.n. [July 22, 1929] (Lw). Bourbon Co.: Kellerman s.n. [Fort Scott, July 15, 1887] (Ka); Z. D. Thompson 163 (Lw), 545 (Lw). Brown Co.: Mrs. O. Olson 2 (Ka--88181). Butler Co.: R. L. McGregor 4048 (Lw). Chautauqua Co.: A. S. Hitchcock s.n. [Chautauqua Co., Aug. 8, 1896] (Ka). Cherokee Co.: A. S. Hitchcock 790 (Ka, N, W--353581); A. A. Jacobs 50 (Ka--77569), 98 (Ka--74042); R. L. McGregor 15332 (W--2345456). Coffey Co.: Eilford s.n. [Sept. '98] (Ka). Cowley Co.: Clothier & Whitford s.n. [Aug. 22, 1897] (Ka); Ryd-

berg & Imler 508 (Lw); M. White s.n. [Apr. '98] (Ka). Crawford Co.: A. S. Hitchcock s.n. [Crawford Co., Aug. 1896] (Ka). Douglas Co.: Derr 40 (Ka); A. O. Garrett 8452 (Se--14963), s.n. [June] (Ob--50767); D. L. Marsh 1522 (Hi--198639, N); R. L. McGregor 31 (Lw, S), 14289 (Hi--198613, W--2327112); F. R. Schallert 4041 (H--5457); Snow 1963 (Lw). Edwards Co.: A. Finch 45 (Ka--80195). Elk Co.: Clothier & Whitford s.n. [Aug. 20 & 21, 1897] (Ka). Ellis Co.: C. S. Sheldon 323 (Al). Franklin Co.: W. E. Castle s.n. [April 10, 1890] (Ob--50768); A. S. Hitchcock s.n. [Franklin Co., July 1896] (Ka); Street s.n. [Princeton, May 19, 1919] (Po--63842). Greenwood Co.: Q. Gillett 36 (K); A. S. Hitchcock s.n. [Eureka, July 1892] (Ka); W. H. Horr s.n. [June 28, 1930] (Lw, Lw). Johnson Co.: W. H. Horr s.n. [Sept. 20, 1928] (Lw); Pellett s.n. [Summer, 1890] (Ka). Labette Co.: A. S. Hitchcock s.n. [Labette Co., Aug. 1896] (Ka); D. Nelson s.n. [May 3, 1924] (Ka--71452); Paull s.n. [Oswego, 5/29/1886] (Cm); Rydberg & Imler 323 (Lw), 379 (Lw, N); Schneck 97 (Ur). Linn Co.: B. F. Bush 15259 (Ka--89270), 15503 (Ka--89283); Clothier & Whitford s.n. [Aug. 9, 1897] (Ka); Gier 7956 (S). Miami Co.: Clothier & Whitford s.n. [Aug. 8, 1897] (Ka); Oyster s.n. [Spring, 1885; Herb. Prager 18629] (Gg--31445), s.n. [May 1886] (Ob--50771); Rydberg & Imler 22 (Ka--74645, Lw, N). Montgomery Co.: Bailey & Bailey 10234 (Ba); Clothier & Whitford s.n. [Aug. 19, 1897] (Ka); N. B. Jacobs 318 (Ka--92925); F. W. Johnson s.n. [Cherryvale, Sept. 16, 1900] (N). Morris Co.: Good 4 (Ka--91088), 25 (Ka--91087). Neosho Co.: Broadbent 22 (Ka); W. H. Horr s.n. [7/25/29] (Lw); Maus 1102 (Ka-72792, Ka--72793). Osage Co.: Z. D. E. Brown s.n. [July 28, 1896] (Ka); F. C. Gates 17317 (Ka--79799); R. L. McGregor 1561 (Lw). Riley Co.: Burtner s.n. [May 10] (Ka); F. C. Gates 12881 (Ka--72873, Ob--50775); Kellerman s.n. [Manhattan, May 18, 1884] (Ka); L. H. Pammel s.n. [Manhattan, May 15, 1927] (Ca--351348, Io--129735); J. F. Ross s.n. [May 15, 1899] (Ka); Walters s.n. [Manhattan, May 2, 1891] (W--222324). Shawnee Co.: Chamberlin 27 (Pl--35099); G. Hale 35 (Ka--78645); V. L. Harms 1379 (Hi--198497, N); Maus s.n. [Auburn, July 20, 1927] (Ka--72218); Pellett s.n. [Topeka, 1928] (Io--132834); F. R. Popenoe s.n. [Topeka, June 2, '80] (Pu). Wabaunsee Co.: A. S. Hitchcock s.n. [Wabaunsee Co., Aug. 23, 1896] (Ka); Maus 36 (Ka--72475), 239 (Ka--72679). Wilson Co.: Haller s.n. [Apr. 23, 1896] (Ka); W. H. Horr s.n. [July 12, 1930] (Lw). Woodson Co.: G. M. Clark s.n. [Batesville, Aug. 20, 1894] (Ka); M. Hale s.n. [1 May 1955] (We); W. H. Horr s.n. [7/11/30] (Lw); E. W. Lathrop 34 (W--2234918), 169 (W--2234972), 556 (N), 1028 (N), County undetermined: Herb. Hapeman s.n. (Hp); Herb. Kans. State Agr. Coll. s.n. [June 18, 1891] (C).

MISSOURI: Bates Co.: Broadhead s.n. [May 1871] (Cm). Boone Co.: Rickett 533 (Ok), s.n. [Bear Spring, April 23, 1927] (H--106468). Clay Co.: Broussard 22 (Je--5131); Gier 8106 (S); G. Moon s.n. [Liberty, 5/14/1940] (Je--3155). Greene Co.: Blankinship s.n. [26-4-79] (Io--34748), s.n. [Willard, July 20, 1919] (Po--63843); B. F. Bush 286a (Ca--25130); P. C. Standley 8367 (W--687327), 9171 (W--688089), s.n. [vicinity of Springfield, May 1905] (W--735592). Iron Co.: Churchill s.n. [Ironton, May 24, 1918] (Ba); J. A. Drushel s.n. [5/28/1916] (Ur); C. C. Epling 6134 (La, Or--20105, Or-20141). Jackson Co.: B. F. Bush 47 (Up--17079), 286 (C), 2901 (N, Ur), 4922 (W--606403), s.n. [4/9/1882] (Cn, Cn), s.n. [Courtney, 5-19-91] (C); K. K. Mackenzie 62 (Dm, I, N, S), 811 (N); C. A. Ripley s.n. [May 1890] (Ob--50764). Jasper Co.: Storm 24 (Ur). Jefferson Co.: Eggert s.n. [Crystal City, 19 Aug. 1886] (Cm, Du--123487); G. J. Goodman 962 (Ok); Goodman & Hitchcock 962 (Po--194454); Lloyd Williams 1468 (I). Johnson Co.: G. W. Stevens 4308 (N). Lafayette Co.: Bailey & Bailey 10284 (Ba). Lawrence Co.: W. Flint s.n. (Dt). Madison Co.: J. M. Greenman s.n. [Mine La Motta, 19 May 1927] (Mn--18638, N). Ozark Co.: B. F. Bush 13329 (Up). Phelps Co.: J. H. Kellogg s.n. [Jerome, Apr. 5, 1914] (N); E. C. Leonard 6592 (W--2164960). Saint Clair Co.: B. F. Bush 13298 (S), 13298a (Ka--84565). Saint Francois Co.: Ahles 2012 (Ur). Sainte Genevieve Co.: Brinker 1533 (I), 1638 (I); Koelling 31 (Ur). Saint Louis: H. N. Andrews Jr. s.n. [4/29/36] (Ms); Eggert s.n. [Stony hills, 16 May 1879] (Se--95715, W--518722); C. C. Epling 6412 (La); Herb. Hitchcock s.n. (Ka); Letterman s.n. [1.1.90] (N). Saint Louis Co.: Eggert s.n. [Allenton, 27 Apr. 1887] (Au, Ca--183199, Cm, Dm, Du--122872, Gg--31281, Io--79867, Mn--6888, Up--60737); Glatfelter s.n. [Allenton, 5-23-92] (Mi, W--308363); Letterman s.n. [Allenton, May 1888] (Ur); Ohlweiler s.n. [Allenton, 4-18-09] (Au); L. H. Pammel s.n. [Allenton, 5-1887] (Io--15338), s.n. [Valley Park, 5-1887] (Io--20748), s.n. [Glencoe, Apr. 22, '88] (Io--20747). Saline Co.: B. F. Bush 13439 (Au, S). Stone Co.: E. J. Palmer 5682 (Po--217515, W--1581050). Taney Co.: W. W. Eggleston 12240 (N, W--644250). Vernon Co.: Palmer & Steyermark 42162 (N, W--1604823). County undetermined: Collector undesignated s.n. [s.w. Mo., 7-89] (Pl--22610); Dapprich 1771 (Sm); James s.n. [near the Lead Mines of Missouri] (T); J. R. Lawrence s.n. [Apr. 7, 1929] (Ms); Letterman 41 (Po); F. Peck 1963 (Dt), s.n. [Missouri] (Pa). ARKANSAS: Baxter Co.: Demaree 28934 (N), 28944 (Hi--51455, Mi, N, Ok, We), 28971 (N, St). Benton Co.: Evans & Morgan 26 (Ok); Heacox s.n. [July 4, '89] (Ob--50766); D. F. Morgan 15 (Ok); Plank s.n. [1899] (N). Bradley Co.: Demaree 24217 (Sm). Calhoun Co.: Demaree 14399 (I, N). Carroll Co.: Del-

linger, Moore, & Barkley 15008 (Au, N, N); A. Nelson 10859 (Du—230822, Um—54, Up); E. J. Palmer 29333 (N).Chicot Co.: Demaree 20933 (N, Sm). Cleburne Co.: Demaree 45072 (Ca). Conway Co.: Demaree 20916 (Ml, N, Sm), 37506 (Sm). Crawford Co.: Demaree 6411 (W—1437257); Shearer s.n. [Dyer, Aug. 28, 1919] (Vi). Drew Co.: Demaree 16566 (Du—256559, En, H—97668, N, Ok). Faulkner Co.: Demaree 5962 (St); F. C. Haas 1674 (W—1654393); Haas & Haas s.n. [April 7, 1934] (Dp). Franklin Co.: Demaree 20890 (N, Sm). Fulton Co.: Demaree 25864 (N). Garland Co.: Demaree 16683 (Du—256562, N, Ok, Se—69268). Grant Co.: D. Taylor s.n. [Grape Vine, 5/2/38] (N). Hempstead Co.: E. J. Palmer 5407 (Po—217508, W—1580971). Hot Spring Co.: Demaree 14301 (Gg—267603, N, Ok), 14878 (Ky, Ok, Pl—131513, Ur), 16734 (N), 16920 (Du—256566, Gg—267602, N, Ok), 16943 (Bt—52485, Io—152222, N, Ok), 17270 (N), 18830 (N, Sm), 18880 (N, Sm), 19020 (N, Sm); Letterman s.n. [Malvern] (W—985805). Izard Co.: Demaree 17004, in part (Du—256565, Ok). Lawrence Co.: Demaree 25957 (N), 30449 (Au—121882, Hi—51437, Mi, N, Ok, We); Rolfs s.n. [8/91] (Io—44895). Logan Co.: Demaree 8110 (W—1582393), 22847 (Sm); Pyle 689 (Au); Mrs. H. S. Young s.n. [June 17, 1925] (Cm). Marion Co.: Demaree 29970 (N), 30110 (N), 31813 (Sm). Nevada Co.: J. P. Davis s.n. [24 April 1960] (Nb). Ouachita Co.: Demaree 16849 (Du—256563, N, Ok). Perry Co.: Welch 1205 (Dp). Polk Co.: Demaree 36603 (Sm, Z). Pope Co.: G. M. Merrill 202 (Il—15853, St—16757, Ur). Pulaski Co.: R. J. Bailey s.n. [April 17, 1937] (Cm); Demaree 18794 (N, Sm); H. E. Hasse s.n. [Little Rock, June 1886] (N); G. M. Merrill 1566 (Ur). Scott Co.: Demaree 18161 (N). Sebastian Co.: Bigelow s.n. [Fort Smith] (W), s.n. [9 miles w. of Fort Smith] (W); Demaree 18143 (N), 20881 (N, Sm). Sevier Co.: Brinkley 62 (Au, Au); Demaree 36578 (Sm, Sm). Sharp Co.: Demaree 26056 (Le). Washington Co.: L. H. Bailey 7565 (Ba); Fassett 17530 (Pl—76609); F. L. Harvey 18 (Cm); B. J. Turner s.n. [Greenland Township] (Au); E. M. Wells 3 (W—981703). Yell Co.: Demaree 20907 (N, Sm), 22777 (Sm); S. Watson s.n. [Mar. 28, 1931] (St—9242). County undetermined: F. L. Harvey 30 (C), s.n. (Ka); L. McLean s.n. [Blue Springs, 8-20-31] (St—14177); L. F. Ward s.n. [Arkansas, 1877] (W—155629), s.n. [Arkansas] (W—155946). LOUISIANA: Acadia Par.: E. Brainerd s.n. [Crowley, March 19, 1908] (Vt); Chambliss s.n. [Crowley, Apr. 5, 1916] (Tl); F. W. Pennell 10189 (N). Avoyelles Par.: Hale s.n. [Red River] (W—314317). Cameron Par.: Cocks s.n. [July 1903] (Tl); S. M. Tracy 8707 (Bm, Es, N, Tl, Tr, Up—50344, W—510599). East Baton Rouge Par.: Correll, Correll, & Brown 10393 (H—73934). Lincoln Par.: Bardin s.n. [Ruston, April 2, 1951] (Tl). Natchitoches Par.: Cocks s.n. [Mar. 15, 1911] (Tl), s.n. [Apr. 15, 1911] (Tl), s.n.

[Apr. 1914] (Tl); L. E. Fox 401 (Nc), 403 (Nc), 404 (Fx), 409 (Fx); E. J. Palmer 7001 (Gg--182240, W--1531581), 7071 (Gg--182149). Orleans Par.: T. Drummond 436 (Au--121796); J. Torrey s. n. (Br). Ouachita Par.: Kral 8404 (Hi--147840). Plaquemines Par.: Langlois s.n. [Febr. 1880] (Up--17077). Rapides Par.: Charette 571 (Vi); Small & Alexander s.n. [Sandhills near Lena, May 1931] (N). Saint Landry Par.: Biltmore Herb. 3655c (S). Saint Martin Par.: Langlois s.n. [8 March 1888] (I). Saint Mary Par.: Penfound s.n. [Cote Blanch Bay, 4/3/32] (Tl); Perkins & Hall 2623 (Po--256898); Rose-Innes & Warnock 701 (Au, N). Saint Tammany Par.: A-nect 20 (W--1036654, W--2261414); Arsène 11093 (W--1031525), 11982 (W--1033039). Tensas Par.: Ewan 19048 (Tl); Penfound s.n. [3-25-37] (Gu--19186, Tl). Terrebonne Par.: Arceneaux 290 (It). Union Par.: Cocks s.n. [Apr. 1913] (Tl). Winn Par.: Penfound s.n. [March 25, 1940] (Tl); N. F. Petersen s.n. [Winnfield, 4-13-12] (N). Parish undetermined: Hale s.n. [w. La.] (Pr); Herb. Hapeman s.n. (Hp); C. Peck s.n. (Ky); Penfound s.n. [Côte Blanch Bay, 4/3/32] (Tl); Short s.n. [Louisiana](Cm, Ll, M, Pr); A. Wood s.n. [March] (Pa). COLORADO: Boulder Co.: Ramaley 15322 (Ok). County undetermined: G. R. Vasey 526 (Cn, Ms, Pa). NEBRASKA: Franklin Co.: Harper & Harper s.n. [July 24, 1897] (Io--133188). Furnas Co.: Lallman s.n. [May 20, 1936] (Bt--46800). OKLAHOMA: Adair Co.: M. Hopkins 3111 (Ok); C. S. Wallis 2859 (St), 6314 (Au--171251, St). Atoka Co.: Folsom s.n. [4-6-23] (Ok--10279); M. Hopkins 2821 (Ok), 2845 (N, Ok); Hopkins, Nelson, & Nelson 1080 (Ok), 1110 (Ok); Hopkins & Van Valkenburgh 4144 (Ok). Bryan Co.: W. S. Blain s.n. [Durant, April 20, 1934] (Bt--29694); C. S. Sheldon 26 (Al, Ob--97281, Se--14962, W--56206). Caddo Co.: Edw. Palmer 246 (T). Cherokee Co.: M. Hopkins 3904 (Ok); Little & Little 19 (Ok), 37 (Ok); W. C. Rhoades 49 (Ok); C. S. Wallis 6457 (St), 6664 (St). Choctaw Co.: H. R. Griffith 21 (St--20095); W. B. Hughes 25 (Au, Ok); J. R. McFarland 83 (Ok); Van Valken-burgh 56 (Ok). Cleveland Co.: F. A. Barkley s.n. [5/1/28] (Ok--10272); Emig 415 (W--643862); F. A. Herzog s.n. [Helsel, April 28, 1904] (Wi); Hibbard 87 (Ok--10288); Jeffs 49 (Ok--10283), s. n. [5/6/1921] (Ok--10310); Jeffs & Johnston s.n. [5-1-28] (Ok--10275); Kitchens 27 (Ok--20505); Mauk s.n. [Norman, 5/14/14] (Ok--20506); Quesenbery 18 (We). Coal Co.: Demaree 11976 (Ok--22229); S. Fry 133 (St--14009); Van Valkenburgh 16 (Ok, St--21428). Comanche Co.: M. K. Clemens 11750 (Gg--37139); Davy 186 (St--20238); Demaree 11957 (Au, Ca--84140, Ca--717794, N, Ok--22155, St--12971, W--1683779), 13168 (Ok--22148, St--12973); Ferguson, Buttram, & Buttram 67 (Ok); M. Gates s.n. [April 1, 1950] (Ok); Hopkins, Nelson, & Nelson 965 (Ok); D. McLean 275

(We); F. B. McMurry 657 (Ok); W. S. Myers 337 (Ok); E. L. Rice s. n. [April 23, 1938] (Ok); M. O. Rice 52 (Ok); Van Vleet s.n. [Mt. Sheridan, 7/4/03] (Du--172644, Ok--10269, W--1242502); Waterfall 2941 (Ca--882622, Ok). Craig Co.: Carleton 7 (Ka, Ur, Ur). Creek Co.: Bailey & Bailey 10220 (Ba); B. F. Bush 437 (C, Ok, W--217401); Schendel 33 (St--17917); Shinners, Cottam, & Stephens 3577 (Ca--882617). Delaware Co.: Blevins 64 (St--18580); R. Goodner 44 (Ok); Reno 26 (Ob--68605); C. S. Wallis 2912 (St), 3769 (St). Garvin Co.: Edw. Palmer 247 (T); G. W. Stevens 109 (Du--65695, N, Ok, Ok, St--9243, Ur), A.115 (St--9245). Greer Co.: Hatchett 20 (St). Haskell Co.: Clark & DeVitt 26 (Ok); Zachritz 15 (St). Hughes Co.: H. Goodman 81 (Ok). Johnston Co.: M. Hopkins 4864 (Ok); Hopkins, Nelson, & Nelson 1024 (Ok). Kay Co.: Davy 79 (St--17575); M. B. George 4 (Ok); Randel 15 (Ok). Kingfisher Co.: L. A. Blankinship s.n. [Apr. 18, 1896] (Ob--50788). Latimer Co.: R. Bebb 8 (Ok); O. M. Clark s.n. [6/ 12/ 30] (Ok--10301); D. H. Dunn 19 (St--20073); M. Hopkins 1864 (Ok). LeFlore Co.: Blakley s.n. [G. W. Stevens 1471] (Ur); Demaree 12104 (N, Ok--22146, St--12972); G. J. Goodman 2525 (Ok); Hopkins & Cross 1528 (Ok); R. F. Mason 119 (Ok), 128 (Ok, Ok, St--14979), 138 (Ok, Ok), s.n. [April 12, 1937] (Ok), s.n. [April 17, 1937] (St--12970); P. M. Nelson 46 (Ok). Lincoln Co.: L. E. Rose 170 (St--19869). Mayes Co.: R. Bebb 2726 (Ok); O. M. Clark 3452 (B); Spesirs 78 (Ok, St-17564); Tripp 166 (St--9237), 167 (St--9238); C. S. Wallis 6678 (Au--171160); Waterfall 15292 (Go, Hi--195032, W--2351771); Wherry s.n. [Pryon, May 2, 1925] (Up). McClain Co.: Van Valkenburgh 1 (Ok). McCurtain Co.: Demaree 12053 (Ok--21772); Goodman & Barkley 2061 (Ok--17714); M. Hopkins 2865 (Ok); Hopkins & Cross 2503 (Ok); Hopkins & Pollock 6291 (Ok), 6302 (Ok); Houghton s.n. [G. W. Stevens 3643] (N, Ur); Little & Olmsted 271 (Ok--10305), s.n. [June 16, 1930] (Ok--10304); C. G. Ward 296 (St--16870). McIntosh Co.: E. Brainerd s.n. [Eufala, April 4, 1908] (Vt); Stretton 5080 (Ml, N, St--26149, St--26150). Murray Co.: Flowers s.n. [May 3, 1939] (Ok). Muskogee Co.: R. Bebb 3590 (Ok), 3816 (Ok), 3888 (Ok, Ok); E. L. Little 36 (Ok--10303), 1577 (Ok--10308), 1578 (Ok--10299), 1579 (Ok--10298), 1869 (Ok--10300), 2614 (Ok--10309); E. J. Palmer 14283 (B); W. Park 103 (Um--26); L. E. Rose s.n. [May 6, 1941] (St--19871); Turley 85 (Ok); C. S. Wallis 3791 (St), 6221 (Au--171257, St), 6462 (St). Okfuskee Co.: O. M. Clark 2387 (Ok--10302); Rey 14 (Ok, St--18078); M. Whitehead 26 (Or--41265). Oklahoma Co.: Harding 81 (St--17577); McLennan 88 (St--24887); Stemen 89 (Ok); Waterfall 2676 (Ok). Okmulgee Co.: D. Williams 18 (Ok). Osage Co.: O. H. Calvert 64 (St--23455); T. Johnson 115 (Ok), 118 (Ok); Liebenheim 49 (St); Perrin 100 (St--9234); Rice

137 (Ok); Sizemore 195 (St); G. W. Stevens 2048 (N, Ok), A.2048 (St--9259); Stout 18 (St--24202); Stratton 5095 (N, St--26151, St--26152). Ottawa Co.: Brensing 28 (Ok); Inkenberry 27 (St--18143); G. W. Stevens 2340 (Du--66385, N, Ok, Ok--21022, W--589900), A.2340 (St--9235); C. S. Wallis 3731 (St); M. C. Whaley 85 (Ok--10307). Pawnee Co.: Prewett 136 (Au). Payne Co.: Bogue 1364 (No--8609); C. O. Chambers s.n. [June 19, 1915] (St--9228); F. Clark s.n. (Id); Cowley 55 (Ok); Deonier 107 (Bt--48281); Divine 104 (Gg--267604); Felts 60 (St--9210); W. B. Hughes 30 (Ca--882621); C. D. Learn s.n. [May 1, 1915] (St--9226); Preston 93 (Bl--42299); Rees 141 (Ok); O. C. Schultz s.n. [June 13, 1927] (St--9232); Stratton 236 (St--25124); Waterfall 104 (St); Waugh 168 (Ka, W--266913); A. D. West s.n. [April 18, 1959] (St). Pittsburg Co.: A. H. Brown 25 (Ok), 60 (Ok); M. J. Hall 26 (Ok); Hopkins & Cross 1638 (Ok); F. W. Pennell 10599 (N); E. Rogers s.n. [4-21-57] (St). Pontotoc Co.: D. McCoy 527 (St), 1288 (St), 2263 (St), 2282 (St), 2449 (St), 2481 (St); G. T. Robbins 2335 (Ca--903931); Van Valkenburgh 2 (Ok). Pottawatomie Co.: E. D. Barkley 27 (Ok--16762); Demaree 11969 (Ok--22231); Faulkner 28 (N), 30 (Ok); M. T. Jacobs 46 (Ok); P. J. White s.n. [Aug. 8, 1900] (Dm). Pushmataha Co.: Mahler 378 (W--2331708); Parkey 22 (Ok); Van Valkenburgh 51 (Ok); Waterfall 633 (Ok), 10550 (St), s.n. [Albion, June 3, 1937] (N). Rogers Co.: Waterfall 1456 (Ok). Seminole Co.: Demaree 11960 (Ok--20365). Sequoyah Co.: C. S. Wallis 3680 (St), 6223 (Au--171258, St). Tulsa Co.: P. V. Beck 156 (Ok), 187 (Ok); Burwell 42 (St--9236); C. Cameron 65 (Ok--10276); Constance s.n. [March 25, 1938] (Mn--32156). Wagoner Co.: R. Bebb 3935 (Ok), 3955 (Ok). Washington Co.: Rees 246 (Or--40101). County undetermined: Bailey & Bailey 10213 [Tala] (Ba); R. Bebb 2160 [Floral] (Ok); Butler 10629 [Indian Terr.] (In); L. Gould 59 (Ok--10274); J. A. Howard s.n. [April 21, 1935] (Ok--18242); W. S. Myers 337 [Wichita Mts.] (Ok); F. H. Rose 7 [Wichita Forest; Herb. U. S. Forest Serv. 42887] (Ca--445582); Mrs. O. St. John s.n. [Indian Territory] (Sd--4249); Sears 566 (Ok--10306); G. W. Stevens A. 1471 (Ok); Waterfall s.n. [Allison, 6/3/1937] (Ms). TEXAS: Anderson Co.: N. B. Furlong 38 (St); Lundell & Lundell 8478 (Ld, Mi, N); E. G. Marsh 1 (Au--121852); E. D. Schulz s.n. [Palestine, 1930] (Wi); Shinners 19260 (Ur); Tharp s.n. [Palestine, 4.14.29] (Au, Au, Au, Mi). Angelina Co.: Hayden s.n. [Lufkin, 1917] (Io--100489). Austin Co.: H. Wurzlow s.n. [Industry, 1891] (Ur). Brazos Co.: Ness s.n. [1900; Reeves 200] (Cs), s.n. [3-28-1926] (Tr); Parks & Cory s.n. [College Station, 4-10-1927] (Tr). Burleson Co.: B. Martin s.n. [Lyons, 3.19.28] (Au). Caldwell Co.: Mc Bryde s.n. [5/15/31] (Nt). Cameron Co.: M. Cannon s.n. [February

9, 1927] (Mi, Mi); Cory 17932 (Tr), 17933 (Tr), 17934 (Tr), 17936 (Tr), 28307 (N); R. Runyon 2497 (N, N, N). Chambers Co.: Tharp 36006 (Au), s.n. [4/7--10/36] (Au, Au, Mi). Comal Co.: Thurow s.n. [Spring Branch, April 29th, 1923] (Hu). Culberson Co.: Hitchcock & Stanford 6782 (N). Dallas Co.: Reverchon 2533 (N). Denton Co.: A. Nelson 10819 (Du--230823, S, Um--11, Up). Falls Co.: Lundell & Lundell 10101 (Ld, N, W--1888891); Whitehouse 19453 (Mi, N). Freestone Co.: Lundell & Lundell 10392 (Ld, N, W--1887659), 11004 (N). Galveston Co.: Mrs. A. F. Nelson s.n. [3-20-42] (Au). Grayson Co.: H. Gentry 122 (Au, N). Gregg Co.: E. J. Palmer 7124 (Gg--182148, W--1531810); C. L. York s.n. [3-20-38] (Au, Au, Gg--316097, N, Sm). Hardin Co.: Whitehouse 8748 (Au). Harris Co.: Biltmore Herb. 3655e (S); G. L. Fisher 33 (W--503107), 40 (W--1203310), 41 (W--1203311), 47 (W--1287656), 52 (Vi), 1707 (W--719766), 41041 (W--1825529), 49033 (Go), s.n. [Houston, March 31, 1912] (Ew), s.n. [Houston, Mar. 2, 1913] (Vi), s.n. [Houston, Apr. 3, 1913] (H--5465, Hp), s.n. [Houston, Apr. 3, 1915] (Du--172646, Mi), s.n. [Houston, Mar. 31, 1918] (Ca--882623), s.n. [Houston, Apr. 3, 1920] (Ur), s.n. [Houston, Apr. 22, 1923] (Hp), s.n. [Spring, May 4, 1924] (Du--172647, Ew, H--5473, Ur), s.n. [Mar. 17, 1930] (I), s.n. [Houston, March 25, 1938] (Gg--310875); Gaston 11 (Au); E. Hall 435, in part (N, Pa, Po--71257, Pr, W); Joor 64 (W--771876), s.n. [Harrisburg, August 10, 1875] (Mi); Lindheimer 137 (W--1870841), s.n. [near Houston, March 1842 (Sm); E. Meyer s.n. [Buffalo Bayou, Feb. 1844] (C).

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BOOK REVIEWS

Alma L. Moldenke

"Flowering Trees of the World for Tropics and Warm Climates", by Edwin A. Menninger; 335 pp., 425 color plates. Hearthside Press, N. Y. 1962. $18.95

The author would have been most pleased with this review if it could have been rendered as a "play-back" of a tape recording of the "ahs", "ohs", and more articulate and laudatory comments of the botanically minded people, lovers of nature and appreciators of the beauty in color photograph and art who have given an almost worn-out look to the review copy of this book in our home! Instead, he and the publisher will have to settle for the written words of wholehearted approval and overwhelming appreciation of this tremendous task, very faithfully, accurately and magnificently presented.

Mr. Menninger states that "the purpose of this book is to put the finger on the flowering trees that somebody thinks are the

most beautiful in the flowering world" of tropical and warm climates. That "finger" is guided by a highly skilled brain, a great heart, and a most perspective eye for beauty, and is accompanied by an expert "green thumb" that has reached into nature's gardens the world around. That "somebody" is the best qualified one to manage this compilation because of his wealth of experience in just this specific field and because of his long established contacts with botanists and plantsmen all over the world. The author asked these folks to nominate their choices, and of their list he selected one thousand species in 500 genera to describe, often in the words of the plant explorers themselves, and 425 to illustrate by means of beautiful color photographs.

So many popular books use only confusing, repetitive and overlapping common names. known often only locally. So many scientific books use only the technical names, supplemented by accurate, but not necessarily attractive, illustrations. This book serves both groups unusually well because the flowering trees are grouped by their families alphabetically, and are given common names as well as scientific names, with authorities and synonyms. The book also includes a thorough index, a helpful bibliography and a highly and variedly useful series of classification tables based on flower and leaf coloring, minimum survival temperatures, growth rates and sizes, resistance to wind, salt spray and fire, odors in flowers and leaves, economic uses, shade and moisture relationships, ecological conditions and geographic ranges, etc. The beginning chapters give a very interesting account of the author's "method" of book production. The writing style is easy and fascinatingly absorbing; the content is accurate. There is even a chapter on "left out" flowering trees to help pacify readers who find a few of their favorites omitted.

It is gratifying to recall that from the author's experimental nurseries at Stuart, Florida, have come over the years the means of beautifying so much of that Sunshine State. The dedication of this book, like the dedication of the author to his own special service to mankind, is heart warming.

The price of the book is amazingly low when its size and the number of its color plates are considered. Most of the plates are exquisite; just a few have lost a little clarity in reproduction.

"Michigan Wildflowers", by Helen V. Smith, illustrated by Ruth P. Brede; 465 pp., 231 line-drawing plates, 16 color plates. University Publishers, New York City. $5.00

This is a pleasing and valuable book because of its natural appearing drawings and color plates, clear text and easy-to-follow keys and descriptions. It lists each plant by one or more common names, by scientific name without synonymy, and by family. Each family is helpfully and interestingly introduced by a brief statement about the number of genera and species in it, its geographic distribution, and a special comment about a few members well known for their attractiveness or economic importance. Many fascinating bits of plant lore are given under some of the spe-

cific descriptions.

There is a fine appeal for the conservation of certain vanishing wildflowers, and some good suggestions for wildflower gardens. The common and scientific name indices, the glossary, the diagrams of flower and leaf parts and types all aid in making the book useful to the amateur as well as to the local botanist. The bibliography is very short.

Perhaps the book was not intended to cover all the herbaceous plants of the state; quite a few omissions are evident. Surely some of Michigan's many grasses and sedges are worthy of a place here. Likewise the family Eriocaulaceae is omitted, even though E. pellucidum occurs in at least 30 counties of the state. In the Verbenaceae only 3 species are listed, but there are 6 species, 1 natural hybrid, and 3 named forms and varieties in the state, one occurring in at least 12 counties. Phyla lanceolata, known from 9 counties, is not mentioned.

This book's extremely modest price, in terms of today's book market, is made possible by a grant from the Edwin S. George Publication Fund to the Cranbrook Institute of Science. This is a worthy service because it puts a good book within easy reach of many more amateurs than would otherwise be able to afford it.

"Photochemistry and Photobiology", an international quarterly journal, Vol. 1, no. 1; A. D. McLaren, editor. Pergamon Press, New York and Oxford. 1962. Individual subscription $10, institutional $20.

This new journal was spawned by the recent Photobiology Congress held in Copenhagen to provide a specific organ for papers in this rapidly expanding field and "to bridge the gap between somewhat opposing views of nature, namely, the physical and the biological." It seeks, and this first issue contains, analytical articles "dealing with the photochemistry or organic substances and the action of infrared, visible and ultraviolet light of biological systems", stressing the quantum aspects of the subject. Rapid publication is an expressed goal; this first issue has achieved it.

The first eight articles emanate from four universities in the United States, from Australia, from Warsaw, from Eindhoven and from Frankfurt. Two of them are in German; the rest in English. The journal will also accept articles in French. One title will serve as a typical example of the material that will be found here: "Ultraviolet light induced spectral changes in nucleotides and nucleic acids".

Recent literature in photobiology organized alphabetically by subject fields is listed on a few pages. There is a photobiology news page. The printing is clean. The instructions to contributors are well organized.

This journal will probably prove to be much in demand in all related fields.

BOOK REVIEW

Gerald S. Hanusik*

"A Dictionary of Terms in Pharmacognosy", by George M. Hocking; 284 pp. Charles C. Thomas, Publisher, Springfield, Ill. 1955.

The author has here compiled a dictionary which will undoubtedly be of value to students in any one of the health professions. It seems to be designed to augment the information given in textbooks, and to provide the student with a handy and quick reference work to use in conjunction with other references.

The dictionary is devoted more to information concerning subjects which are not usually covered in ordinary reference texts, than it is to subjects more easily accessible in the many references available. This compilation of words and phrases in a genuinely revealing work which gives a broad coverage to a field heretofore deprived of any single reference which would be adequate.

A work of this magnitude is without question a monumental task. An author who undertakes to write a scientific dictionary must first be a scientist who is qualified in his specialty, and, secondly, he must be a man of diligence and fortitude. The writing of a dictionary is not an easy task. It therefore goes without saying that omissions and mistakes will occur. This dictionary is quite thorough, and this reviewer could find only a few omissions of information in some of the categories which the author covers. One of these omissions is under the topic of Almond. Here he has failed to distinguish between Sweet Almond (Prunus amygdalus dulcis), which is used as a food, and Bitter Almond (Prunus amygdalus amara), which is poisonous due to the presence of amygdalin, a substance which also gives to Bitter Almonds their bitter taste.

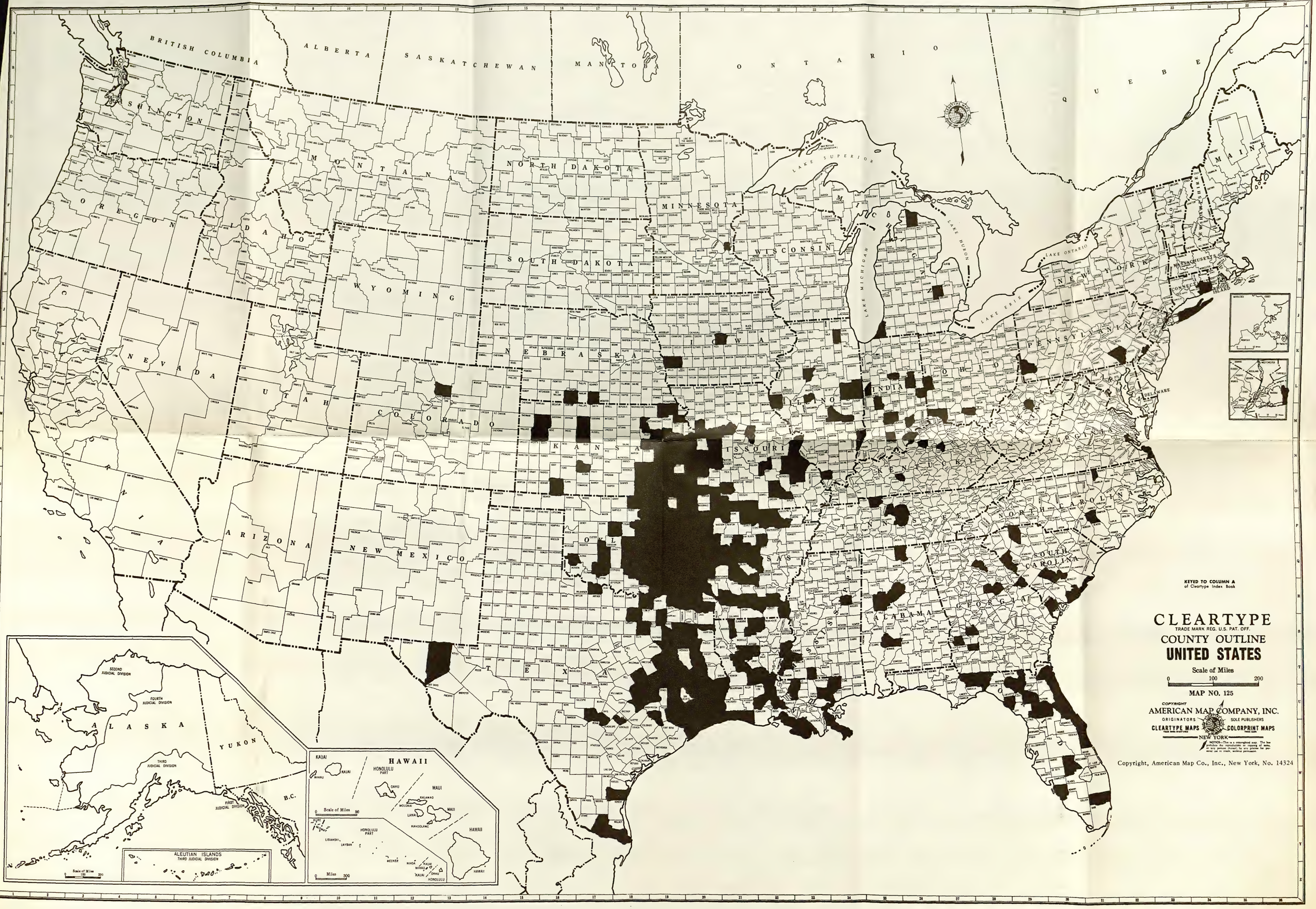
This omission is small when compared to the magnitude of the dictionary and the large number of categories covered. However, due to the fact that the book is designed mainly for use by students, I feel that this omission should not be overlooked. Aside from this and a few other small items that were overlooked, unintentionally, I am sure, this dictionary is a very concise and valuable reference work for the student.

In closing, may I say that the author should indeed be proud of his work. He must have been looking at the subject through the eyes of the students whom he will indirectly help with this book.

*B.S. in Pharmacy, Fordham University College of Pharmacy; at present a pharmacist with Reife's Pharmacy, Yonkers, New York.

Figure 7. Distribution of Verbena canadensis in the United States

Mapping by counties done by Andrew R. Moldenke



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NOMENCLATURAL REMARKS ON THE GENUS SCIRPUS I

Tetsuo Koyama

The following notes are based on some synonyms that were overlooked, and the examination of a number of critical specimens and old literature references that were unavailable to me when I was preparing a treatment of some of the aphyloid species of Scirpus that occur in North America.

1. Scirpus juncoides Roxb., Hort. Beng. 81. 1814, nomen nudum, & Fl. Ind. ed. 1, 1: 228. 1820.
   var. DIGYNUS (Böckeler) T. Koyama, comb. nov.
   Scirpus supinus Linn. β digynus Böckeler in Linnaea 36: 700. 1869-70.

Böckeler's var. digynus was a new name based on S. debilis Pursh, non Lamarck, and has priority over var. williamsii. The synonymy and status of var. williamsii have been fully discussed in a recent paper (T. Koyama in Can. Journ. Bot. 40: 914, 915. 1962).

2. Scirpus juncoides Roxb. var. juncoides.
   Scirpus supinus Linn. γ elatior Böckeler, in Linnaea 36: 700. 1869-70. In major part, excl. syn. S. wallichii.

Bockeler's var. elatior was based on S. juncoides, and could be included in the synonymy of S. juncoides var. juncoides.

3. Scirpus lacustris Linn., Sp. Pl. ed. 1, 48. 1753. subsp. CREBER (Fernald) T. Koyama, comb. nov.
   Scirpus validus Vahl, Enum. Pl. 2: 268. 1806.
   Scirpus validus Vahl, var. creber Fernald in Rhodora 45: 282. 1943.
   Schoenoplectus validus (Vahl) Á. Löve & D. Löve in Bull. Torr. Bot. Club, 81: 33. 1954.

Schoenoplectus validus Á. Löve & D. Löve subsp. creber (Fernald) A. Löve & D. Löve, l. c. 81: 33. 1954.

This new combination replaces S. lacustris ssp. validus and has priority as creber was first treated as a subspecies by Löve and Löve.

4. Scirpus lacustris Linn. subsp. creber T. Koyama
var. LUXURIANS (Miquel) T. Koyama in Can. Journ. Bot. 40: 927. 1962, sub ssp. valido, em. hoc. loco.

Scirpus tabernaemontani C.C. Gmelin forma luxurians Miquel, Ann. Mus. Bot. Lugd.-Batav. 2: 143. 1865.

Scirpus hippolyti V. Krecz. in Not. Syst. ex Herb. Inst. Bot. Acad. Sci. URSS. 7 (1): 28. 1937. Syn. nov.

Schoenoplectus hippolyti V. Krecz., eadem loco. Nomen invalidum ex synonymis.

The holotype of S. hippolyti, Central Asia: Kasaktania, F. N. Rusanov 249! (LE), has been examined. It was, as suggested in my previous paper (T. Koyama, 1962.), identical with var. luxurians of southeastern Asia.

NOTES ON NEW AND NOTEWORTHY PLANTS. XXXIII

Harold N. Moldenke

CITHAREXYLUM POEPPIGII f. ANOMALUM Moldenke, f. nov.

Haec forma a forma typica speciei alabastris elliptico-elongatis, ad apicem conicis vel attemuatis, et calicibus elongatis cylindricis 6--9 mm. longis recedit.

This form differs from the typical form of the species in having its unopened flower-buds elliptic-elongate, gray-puberulent, conspicuously conic or attenuate-conic at the apex, and the calyx elongate-cylindric, 6--9 mm. long.

The type of this puzzling form was collected by A. L. Bernardi (no. 2142) in wet tropical woods at Camp No. 3, 33 km. from El Dorado, between Río Cuyuni and the road to the south which is in the process of being built, Bolívar, Venezuela, on April 9, 1955, and is deposited in the Herbario Nacional de Venezuela at Caracas. The inflorescences give one the impression of some abnormal condition.

CITHAREXYLUM POEPPIGII var. CALVESCENS Moldenke, var. nov.

Haec varietas a forma typica speciei foliis subtus minute puberulis calvescentibus recedit.

This variety differs from the typical form of the species in having the lower surface of its leaf-blades only very minutely puberulent or glabrescent.

The type of the variety was collected by my good friend and colleague, José Cuatrecasas Arumi (no. 15949) in woods at Veneral, at an altitude of 5 to 50 meters, Río Yurumanguí, on the Pacific coast, Valle del Cauca, Colombia, between January 28 and February 10, 1944, and is deposited in the Britton Herbarium at the New York Botanical Garden.

CLERODENDRUM SERRATUM var. VELUTINUM Moldenke, var. nov.

Haec varietas a forma typica speciei laminis foliorum petiolisque inflorescentiisque dense velutinis et foliis parvis recedit.

This variety differs from the typical form of the species in having only small leaves at time of anthesis, 4--7 cm. long, 2--3 cm. wide, oval in outline, densely velutinous on both surfaces, and the peduncles, pedicels, rachis, branches of the inflorescence, bracts, and calyxes also densely velutinous.

The type of the variety was collected by F. Kingdon-Ward (no. 22153), growing in an old recently abandoned "taungya" on open hillsides covered with grass and tangled thickets, at Mindat, at about 5000 feet altitude, in west central Burma, on April 26, 1956, and is deposited in the herbarium of the British Museum (Natural History) in London. The collector describes the plant as a soft-wooded shrub with numerous stems.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. VIII

Harold N. Moldenke

VERBENA L.

Additional and emended bibliography: Hook., Bot. Misc. 1: 129--173, pl. 46--48. 1829; Maund, Bot. Gard. 9: pl. 197. 1839--1851; Lem., Horticult. Univ. 3: 9. 1842; S. Wats., Proc. Am. Acad. Sci. 18: 135--136. 1883; Briq., Arkiv Bot. Stockh. 2 (10): 7--14, pl. 3. 1904; Rep. Bot. Exch. Club Brit. Isles 1927: 452. 1928; Herter, Florula 105--106. 1930; Parodi, Rev. Argent. Agron. 1: 202. 1934; Beale, Chron. Bot. 5: 517. 1939; Herter, Revist. Sudam. Bot. 7: 225. 1943; Barton & Garmon, Contrib. Boyce Thompson Inst. 14: 243, 246, & 252. 1946; Angely, Fl. Paran. 7: 4 & 12--13. 1957; T. H. Everett, New Illustr. Encycl. Gard. 13: 2404--2406. 1960; Menninger, Flow. Trees World 18, 281, 286, 298, & 335. 1962.

Additional abbreviations used for the names of herbaria in this series besides those listed or referred to in Phytologia 8: 95 (1961) are

Am = Southwest Research Station, American Museum of Natural History, Portal, Arizona
Hi = University of North Carolina, Chapel Hill, North Carolina
Og = P. Olrog Herbarium
Pm = Pharma Herbarium, CIBA, Basle, Switzerland
Rf = Texas Research Foundation, Renner, Texas
Ws = University of Wisconsin, Madison, Wisconsin

VERBENA ABRAMSI Moldenke

Balls found this plant growing in moist heavy soil along with Mimulus cardinalis Dougl.

Additional citations: CALIFORNIA: Kern Co.: Groesbeck s.n. [Glenville, 6.6.1954] (Bm). Los Angeles Co.: Balls 10065 (Bm).

VERBENA ALATA Sweet

Additional bibliography: Angely, Fl. Paran. 7: 12. 1957.

Material of this species has been misidentified and distributed in herbaria as V. littoralis H.B.K.

Additional citations: BRAZIL: Minas Gerais: Regnell I.326, in part [19-11-1864] (W--1199649). Santa Catarina: Reitz & Klein 5484 (W--2269015); Smith & Klein 8065 (W--2251339); Smith & Reitz 9059 (W--2251487).

VERBENA AMBROSIFOLIA Rydb.

The E. Stearns 104, annotated as V. ambrosifolia by Perry, does not seem to belong here. I am citing it under V. delticola Small, as also the Mearns 591 which she annotated as "Cf. Verbena ambrosifolia Rydb."

Additional citations: OKLAHOMA: Cimarron Co.: Demaree 13335

(Rf). TEXAS: Brewster Co.: C. H. Muller s.n. [Cat-tail Canyon, 7-6-32] (Ar--199985); B. H. Warnock 10562 (Rf), 10882 (Rf), W.283 (Rf). Culberson Co.: Correll & Johnston 19136 (Rf), 20370 (Rf); Correll & Rollins 23785 (Ld). Dallam Co.: D. S. Correll 16639 (Rf). Hudspeth Co.: C. H. Muller 8215 (Rf). Pecos Co.: B. H. Warnock 5169 (Rf), 11851 (Rf). Presidio Co.: Correll & Johnston 21852 (Ld). Reeves Co.: Correll & Johnston 18592 (Rf); B. H. Warnock 10185 (Rf). Terrell Co.: Warnock & McBryde 14750 (Rf). MEXICO: Nuevo León: Edw. Palmer 1050, in part [Monterey] (W--56188). Tamaulipas: Rozynski 312 (W--1588439).

VERBENA ANDRIEUXII Schau.

The type collection of this species was gathered "Inter Chila (dit. de Puebla) et Huanapan (dit. de Oaxaca)" according to Schauer. The species has been found on mountain ridges at altitudes of 6500 to 8000 feet, flowering in June and November. Perry annotated Edw. Palmer 34 as "Aff. V. delticola Small".

Additional citations: MEXICO: Oaxaca: E. W. Nelson 1895 (W--250226). Oaxaca or Puebla: Andrieux 138 (W--photo of isotype). San Luis Potosí: Edw. Palmer 34 (W--470888).

VERBENA ARISTIGERA S. Moore

Additional citations: PARAGUAY: T. Meyer 153 (Bm). ARGENTINA: Chaco: Venturi 9780 (Bm).

VERBENA AUSTRALIS Moldenke

Additional bibliography: Angely, Fl. Paran. 7: 6, 7, & 12. 1957.

VERBENA BALANSAE Briq.

Additional bibliography: Angely, Fl. Paran. 7: 12. 1957.

Additional citations: BRAZIL: Paraná: Dusén 16907 (W--1481761).

VERBENA BERTERII (Meisn.) Schau.

This species has been collected in fruit in October and November. Sandeman states that it attains a height of 1 to 2 feet and is an "herb with pinkish lilac flowers growing in full exposure. Very widely distributed in this locality [Valparaíso Reservoir]" or with "pale lilac or cream-coloured (less common)" flowers. The Miers collection from Concan is marked "sp. nov.?" and is a mixture with V. sulphurea D. Don. Herbarium material has been misidentified and distributed as V. dissecta Willd.

Additional citations: CHILE: Coquimbo: Claude-Joseph 4451 (W--1283809), 5053 (W--1422160). Santiago: Claude-Joseph 2898 (W--1233408). Valparaíso: J. Anderson s.n. [Valparaiso] (Bm); Bridges s.n. [Prov. Valparaiso, 1844] (Bm); A. Calvert s.n. [Valparaiso] (Bm); Claude-Joseph 3769 (W--1281646); Cuming s.n. [Valparaiso]

(Bm); Miers s.n. [Concan] (Bm, Bm); Sandeman 175 (Bm), 197 (Bm). Province undetermined: Bridges 455 (Bm); Claude-Joseph 1248 [Costa] (W--1059264), 4456 (W--1284379); Collector undesignated 623 (Bm); Miers 602 (Bm); E. W. White 22 (Bm).

VERBENA BIPINNATIFIDA Nutt.

Additional bibliography: S. Wats., Proc. Am. Acad. Sci. 18: 136. 1883; T. H. Everett, New Illustr. Encycl. Gard. 13: 2406. 1960.

Collectors have found this plant also growing in black clay, sandy black soil, and grayish calcareous soil. Specimens have been misidentified and distributed in herbaria as V. officinalis L. On the other hand, the Hamby 514 and Ibana García 331, distributed as V. bipinnatifida, are V. bipinnatifida var. latilobata Perry; Purpus 4524 (in part) is V. bracteata Lag. & Rodr.; and Hinton 11914 is V. teucriifolia Mart. & Gal.

Additional citations: TEXAS: Andrews Co.: Lundell & Lundell 11405 (Rf). Atascosa Co.: C. D. Marsh 11087 (Ar--14813). Bexar Co.: Reynaldo Ramirez 36 (Ok). Concho Co.: Hamby 944 (Ar--206756). Crockett Co.: Warnock & McBryde 15219 (Rf), 15313 (Rf). Dallas Co.: C. L. Lundell 11704 (Rf); Lundell & Lundell 11315 (Bm), 12132 (Rf, Rf); O. Sanders s.n. [Ledbetter Drive, April 10, 1957] (Rf). Deaf Smith Co.: C. L. Lundell 11457 (Rf). DeWitt Co.: Blanch 50 (Ok); Correll & Schweinfurth 15556 (Rf). Gillespie Co.: Correll & Johnston 19558 (Rf); Hamby 899 (Ar--206746). Hays Co.: R. M. King 2615 (Ld). Jefferson Co.: Lundell & Lundell 11232 (Rf). McMullen Co.: Alvarez, Guajardo, Salazar, & McCart 7710 (Ok); Paez 112 (Ok). Medina Co.: Hamby 595 (Ar--206704); C. D. Marsh s.n. [Near Hondo, Apr. 4, 1908] (Ar--7491). Oldham Co.: C. L. Lundell 11462 (Rf); Lundell & Lundell 11450 (Rf). Pecos Co.: B. H. Warnock 13356 (Rf). Randall Co.: Lundell & Lundell 11444 (Ld). Tarrant Co.: Ruth 107 (Rf). Taylor Co.: Lundell & Lundell 11364 (Rf, Rf). Terrell Co.: Warnock & McBryde 14866 (Rf). Travis Co.: Barclay & Perdue 778 (Ld). Uvalde Co.: C. L. Lundell 10955 (Rf), 10958 (Rf), 10975 (Rf). Val Verde Co.: Warnock & McBryde 15073 (Rf); Warnock & Turner 703 (Rf, Rf). Victoria Co.: F. L. Lewton 60 (Ar—271672). Ward Co.: H. E. Wheeler s.n. [near Monahans, April 21, 1938] (Ar—224580). Zavala Co.: B. Stewart 52 (Ok).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry

Additional citations: MEXICO: Chihuahua: C. H. Muller 3347 (Rf). Durango: Ibana García 331 (W--1013337).

xVERBENA BLANCHARDI Moldenke

The E. W. Lathrop 369, distributed as this hybrid, is actually V. canadensis (L.) Britton.

VERBENA BONARIENSIS L.

Additional and emended bibliography: Hook., Bot. Misc. 1: 166. 1829; Angely, Fl. Paran. 7: 12. 1957; T. H. Everett, New Illustr. Encycl. Gard. 13: 2406. 1960.

Hooker (1829) says of this species "Hab. Vulgaris, praecipue in locis cultis. In Bonnaria et Mendoza. I possess this plant from almost all the warm parts of South America, from the Cape of Good Hope, from Mauritius, and from New Holland. The flowers are so crowded as to make the spike appear almost cylindrical. The calyx is closed over the fruit. splitting down to the base in one or more places, most readily on each side of the shorter tooth, which often thus constitutes a separate leaflet. The Verbena littoralis of Humboldt seems to be a variety of this with shorter spikes than usual."

The Osten 5391, distributed as V. bonariensis, is actually var. conglomerata Briq.; Hollermayer s.n. [Werdermann 1362], W. G. Houk s.n. [Herb. Inst. Bot. S. Paulo 240], and Jensen-Haarup s.n. [Santa Rosa, 1904] are V. brasiliensis Vell.; Claude-Joseph 1889 is V. corymbosa Ruíz & Pav.; Buchtien 4459 and Morong 1540 (in part) are xV. dermeni Moldenke; Jörgensen 2468 is V. intermedia Gill. & Hook.; Widgren 898 is V. lindbergi Moldenke; and O. Solís 70 is V. sphaerocarpa Perry.

Additional citations: BERMUDA ISLANDS: Main: Brown & Britton 98 (W—524814); Harshberger s.n. [Pembroke's Swamp, June 21, 1905] (W—847616). JAMAICA: W. Harris 9132 (W—524608); Harris & Lawrence C.15120 (W—794026); Nichols 163 (W—429097); Alexandrina Taylor 4244 (W—848565). BRAZIL: Santa Catarina: Reitz 3321 [Herb. Barb. Rodr. 4993] (W—2141662); Smith & Klein 11394 (W—2251776); Smith, Reitz, & Sufridini 9426 (W—2251548), 9545 (W—2251564). CHILE: Valdivia: R. A. Philippi 1303 (W—1323051). ARGENTINA: Buenos Aires: R. Alvarez 759 (Bm); Boffa s.n. [Berisso, XII.1944] (Bm); Ruíz Huidobro 1666 (Bm), 1695 (Bm), 1771 (Bm). Río Negro: W. Fischer 236 (W—704427). Tucumán: Descole & Schreiter 10752 (Bm); Venturi 2812 (W—1591268). SOUTHERN RHODESIA: N. C. Chase 1 (Bm, Bm). PORTUGUESE EAST AFRICA: Lourenço Marques: F. A. Mendonça 2973 (Bm). REPUBLIC OF SOUTH AFRICA: State undetermined: Ecklon & Zeyher s.n. (W—1578500). MASCARENE ISLANDS: Mauritius: Roxburgh s.n. (Bm). INDIA: Uttar Pradesh: B. L. Gupta s.n. [Mussoorie, Sept. 1927] (W—1272334). NEW CALEDONIAN ISLANDS: New Caledonia: Le Rat 2345 [U. S. Nat. Arb. 218543] (W—2185073). AUSTRALIA: New South Wales: Constable 19183 (W—2126578); Goode 82 (Bm).

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional bibliography: Angely, Fl. Paran. 7: 12. 1957.

Additional citations: PARAGUAY: Hassler 8934 (Bm). URUGUAY: Osten 5391 (W—1177973).

VERBENA BRACTEATA Lag. & Rodr.

Additional and emended bibliography: S. Wats., Proc. Am. Acad. Sci. 18: 136. 1883; H. V. Sm., Mich. Wildfls. 313, 315, 317, & 465, pl. 155. 1961.

Additional illustrations: H. V. Sm., Mich. Wildfls. pl. 155. 1961.

The Canby, Sargent, & Trelease 194, distributed as this species, is V. canescens var. roemeriana (Scheele) Perry; MacDougal 73 is V. gooddingii var. nepetifolia Tidestr.; Edw. Palmer 456 and W. Schumann 1070 are V. gracilis Desf.; and A. W. Chapman 69 is xV. perriana Moldenke.

Additional citations: ALABAMA: County undetermined: Buckley s. n. [Alabama] (Bm); Rugel s.n. [ad vias et in incultis arenosis per Alabamam mediam] (W—2188141). ILLINOIS: Tazewell Co.: V. H. Chase 13539 (Rf). County undetermined: Meade s.n. (Bm). KANSAS: Kiowa Co.: Horr & McGregor 3790 (Rf). UTAH: Rich Co.: M. E. Jones s.n. [Alta, Aug. 2, 1879] (Bm). COLORADO: Boulder Co.: Ewan s.n. [Plant. Exsicc. Gray. 1090] (Bm). OKLAHOMA: Murray Co.: G. M. Merrill 428 (Rf), 747 (Rf). TEXAS: Andrews Co.: Scudday s.n. [September 1957] (Rf, Rf). Culberson Co.: B. H. Warnock 6276 (Rf), 14313 (Rf). Dawson Co.: Lundell & Lundell 16873 (Rf), 16973 (Rf). Hudspeth Co.: B. H. Warnock 9346 (Rf). Presidio Co.: Warnock & McBryde 14542 (Rf). Tarrant Co.: Cory 54522 (Rf). Wheeler Co.: Correll & Johnston 17044 (Rf). Wood Co.: C. L. Lundell 12081 (Rf). NEW MEXICO: Dona Ana Co.: Wooton s.n. [Mesa west of the Organ Mountains, Aug. 26, 1899] (Bm). WASHINGTON: Stevens Co.: R. K. Beattie 11728 (Rf). MEXICO: Coahuila: Edw. Palmer 1048 (W—1323058); Purpus 4524, in part (W—841895). CULTIVATED: Germany: Bilimek s.n. [8/8/60] (Bm).

VERBENA BRASILIENSIS Vell.

Additional bibliography: Angely, Fl. Paran. 7: 12. 1957.

The W. G. Houk specimen cited below was originally identified as "Stachytarpheta jamaicense Vahl" and later as Verbena bonariensis L.

Additional citations: TEXAS: Hardin Co.: C. L. Lundell 14083 (Rf). Jefferson Co.: C. L. Lundell 14136 (Rf). COLOMBIA: Santander: Killip & Smith 17340 (W—1352959). BRAZIL: São Paulo: W. G. Houk s.n. [Herb. Inst. Bot. S. Paulo 240] (W—1592309). Santa Catarina Island: Reitz & Klein 292 [Herb. Barb. Rodr. 6318] (W—2321087). BOLIVIA: El Beni: Buchtien 4688 (W—1159360). La Paz: M. Bang 136 (W—72000). PARAGUAY: Morong 128 (W—243599). CHILE: Aconcagua: R. C. McLean Q.6 (Bm). Valdivia: Hollermayer s.n. [Werdermann 1362] (Bm, W—1516867). Valparaíso: Cuming 352 (Bm). Province undetermined: E. C. Reed s.n. [Chili] (Bm). ARGENTINA: Buenos Aires: H. M. Curran s.n. [Oct. 19, 1913] (W—920853).

Mendoza: Jensen-Haarup s.n. [Santa Rosa, 1904] (W--1081083); Semper 342 (Bm).

VERBENA CALLIANTHA Briq.

Additional citations: ARGENTINA: Tucumán: Venturi 2922 (W--1591272), 3568 (W--1591276).

VERBENA CAMERONENSIS L. I. Davis

The specimen of Edw. Palmer 90 in the British Museum herbarium bears a notation "conspecific with this is a specimen at Kew collected by Palmer in 1904. I_t is unnamed. L. M. 4/1920." Santos collected the species in calcareous loam, flowering in March.

Additional citations: TEXAS: Cameron Co.: C. L. Lundell 10771 (Rf); Traverse 1107 (Rf). Hidalgo Co.: M. Santos 42 (Ok). MEXICO: San Luis Potosí: C. L. Lundell 12256 (Rf). Tamaulipas: Edw. Palmer 90 (Bm).

VERBENA CAMPESTRIS Moldenke

Additional citations: BRAZIL: Santa Catarina: Reitz 3369 (W--2104858).

VERBENA CANADENSIS (L.) Britton

The E. W. Nelson 6628 [6028] and Pringle 11843, distributed as this species, are actually V. delticola Small, while Lemmon & Lemmon s.n. [Peach Springs, June 1884] is V. gooddingii Briq. The Lathrop collection cited below was originally distributed as xVerbena blanchardi Moldenke.

Additional citations: KANSAS: Woodson Co.: E. W. Lathrop 369 (W--2235043). LOUISIANA: Tensas Par.: Ewan 19048 (Bm). TEXAS: Cherokee Co.: Correll & Correll 20557 (Rf). Freestone Co.: Lundell & Lundell 11004 (Rf). Harris Co.: Penfound s.n. [E. Houston, April 10, 1936] (Tl, Tl); Ravenel s.n. (W); Snyder s.n. [Cypress, 1906] (Ca--185370); Tharp & Barkley 17To30 (Ca--788197, Ur). Henderson Co.: Cory 53953 (Rf); Lundell & Lundell 8489 (Ld, Mi, N); O. Sanders 151 (Mi, Sm); Tharp s.n. [June 6, 1932] (Au, Au); Tindel 5 (Nt). Hidalgo Co.: Clover 566 (Mi); R. Runyon 2625 (N, N). Houston Co.: A. Freeman s.n. [2.28.1930] (Au); E. J. Palmer 12056 (Au--121847, Ca--425591); Tharp 838 (N, W--1104761). Hunt Co.: Strandtman s.n. [Reeves 201] (Cs). Jasper Co.: Cory 52728 (N, No--15422), 52864 (N, No--15413); Lundell & Lundell 11184 (Sm), 11203 (N, Rf); Tharp s.n. [4/13/41] (Ca--882619). Jefferson Co.: Bray 65 (Au). Kendall Co.: H. B. Parks s.n. [Cory 29520] (N). Kleberg Co.: G. L. Fisher 41065 (W--1825544). Lamar Co.: Brozleton s.n. [Paris, 1933] (Au); G. Jones 2 (Ok); McMullen s.n. [Paris, 3/13/27] (Au), s.n. [Paris, 3/15/27] (Au). Lee Co.: Lundell & Lundell 10094 (Ld, N). Leon Co.: Correll, Johnston, & Edwin 22403 (Ld); Lundell & Lundell 10382 (Ld, N). Liberty Co.:

E. J. Palmer 11979, in part (Au--1218l46, Ca--425593, Po--220204). Madison Co.: Huss 91 (Ca--37893). Marion Co.: R. Bebb 2645 (Ok, Ur); Correll & Lundell 18791 (Rf); B. B. Harris 446 (W--1466779), 456 (W--1466784), s.n. [4-20-30] (Nt). Milam Co.: Lundell & Lundell 10096 (Ld, N); Wolff 4026 (Tr). Montgomery Co.: D. S. Correll 14168 (Sm); E. J. Palmer 33319 (N); Tharp & Barkley 17To30 (Au); Warner s.n. [Willis] (Hu). Nacogdoches Co.: Lundell & Lundell 9721 (Ld, N), 9751 (N). Newton Co.: C. C. Albers 39009 (Au); Cory 52606 (N, W--1925316). Orange Co.: Bray 65 (W--358206). Polk Co.: Girvin 2000 (Au), s.n. [March 15, 1940] (Au); Lundell & Lundell 9723 (Ld, N), 9724 (Ld, N), 11291 (N, Rf); E. J. Palmer 5185 (Po--217712, W--1581012); Rose-Innes & Warnock 765 (Au, N); Tharp s.n. [4-25-36] (Ca--882620), s.n. [3/15/41] (Au, Au, Ca--882618, Gg--315064). Red River Co.: E. Adams 69 (Nt); Sartwell s.n. [Red River, red] (Ru--21594). Robertson Co.: Hardin 547 (Hi--111002, Mi, W--2327778); Lundell & Lundell 10098 (N), 10099 (Ld, N), 10380 (N); Reeves 184 (N); Rowell 8001 (N). Rusk Co.: Henderson School 7102 (W--1465393); Herb. Univ. Texas 7102 (Au). Shelby Co.: D. S. Correll 16167 (Rf). Smith Co.: Cory 54999 (W--2007302). Trinity Co.: Parks & Cory 7963 (Tr). Tyler Co.: Lundell & Lundell 9731 (Ld, N), 10945 (N, Rf); Whitehouse 8747 (Au, N). Upshur Co.: D. S. Correll 13161 (Sm). Van Zandt Co.: J. B. Henderson 5697 (W--1468813); Juanita Johnson s.n. [Wills Point, 4.17.1930] (Au); Lundell & Lundell 9698 (Ld, N, W--1887576), 10437 (Ld, N); Peckham s.n. [May 1930] (Au); Raborn & Reynolds 42 (Au), 8746 (Au). Wood Co.: McMullen s.n. [Golden, Aug. 3, 1926] (Au). County undetermined: Belfrage s.n. [20--24.4.1860] (S), s.n. (S); Brace s.n. [1872] (W--310733); Collector undetermined 263 (Au--121848); Drummond II.s.n. (Lu), III.263 (Lu); B. B. Harris 446 (Nt), 456 (Nt); Ness s.n. (Tr); Normand s.n. [Muskogee Railroad, 3.13.27] (Au). FRANCE: Beauregard B.132 (M). GERMANY: Gibbes 13-1 (N). CULTIVATED: Belgium: Herb. Jard. Bot. Brux. s.n. [14 Sept. 1889] (Br); Lejeune s.n. [1839] (Br), s.n. [Hort. Leod.] (Br); M. Martens s.n. [h.b.Lov. 1839] (Br), s.n. [h.b.L.] (Br). Connecticut: Herb. Denslow s.n. [June 1865] (Ms). District of Columbia: Vasey s.n. [Washington, from seed] (W). France: Collector undesignated s.n. [jardin de Mr. Clément à Montpellier] (Au--121848), s.n. [h. P.] (Sg--16094); Herb. Berg s.n. [1839] (Du--166483); Herb. Decaisne s.n. [h. P. 1829] (Br); Herb. Dumortier s.n. [1826] (Br); Herb. W. H. Harvey s.n. [hort. Burdig. 1815] (Du--166482), s.n. (Du--166481); Herb. Saldanha 2770 (Ja); B. Jussieu s.n. [1770] (S). Georgia: E. C. Marquand s.n. [April 18, 1931] (N). Germany: Herb. Calif. Acad. Sci. 31446 (Gg); Herb. Martius s.n. (Br, Br);

Herb. Molliano s.n. [h. E. 1807] (Br); Herb. Mus. Bot. Stockholm s.n. [e horto Hamb. 1829] (S), s.n. [h. Berol.] (S); Herb. Prager 18643, in part (Gg--31458). Illinois: Mrs. Parker Earle s.n. [Aug. 14, 1880] (Ur); E. Hall 1963 (Dt); Vasey s.n. (Ur). Iowa: Elrod s.n. [Indianola, May 21, '86] (Mn--18070); Mrs. Fischer s.n. [Iowa, Aug. 1925] (Ba). Italy: Herb. W. H. Harvey s.n. [Bellovaco, 1841] (Du--166484). Java: Herb. Hort. Bot. Bogor. XV.K.A.XLV.2 (Bz--26427), XV.K.A.XLV.4 (Bz--26429). Kansas: E. Hall s.n. [cult. sp. 1868] (W). Kentucky: C. Peck s.n. [seeds from Louisiana, Aug. 1835] (Ky); C. W. Short s.n. [1835] (W--771875). Maryland: McCann s.n. [seed from Copenhagen, 9-15-36] (Md). Massachusetts: L. H. Bailey s.n. [June 1883] (Ba), s.n. [June 21-23, 1919] (Ba). New Jersey: R. T. Clausen H.532 (Ba); Guyot s.n. (Pr); G. H. Lawrence P.392 (Ba), P.584 (Ba). New York: L. H. Bailey s.n. [Haage & Schmidt seed 5196; July 25, 1926] (Ba), s.n. [Haage & Schmidt seed 5196; Aug. 15, 1926] (Ba), s.n. [Haage & Schmidt seed 5197; July 22, 1926] (Ba), s.n. [Haage & Schmidt seed 5197; Sept. 8, 1926] (Ba), s.n. [Haage & Schmidt seed 5198; July 23, 1925] (Ba), s.n. [Haage & Schmidt seed 5198; Aug. 7, 1925] (Ba), s.n. [Haage & Schmidt seed 5198; Aug. 8, 1925] (Ba, N--photo, N--photo, Z--photo, Z--photo), s.n. [Haage & Schmidt seed 5198; Aug. 15, 1926] (Ba), s.n. [Haage & Schmidt seed 5198; Oct. 8, 1926] (Ba), s.n. [Vilmorin-Andrieux seed 80050; June 30, 1919] (Ba), s.n. [Vilmorin-Andrieux seed 80050; July 4, 1919] (Ba), s.n. [Vilmorin-Andrieux seed 80064; June 28, 1919] (Ba), s.n. [Vilmorin-Andrieux seed 80064; Aug. 31, 1924] (Ba), s.n. [root from Shreve, Ark., July 25, 1926] (Ba), s.n. [root from Shreve, Ark., Aug. 15, 1926] (Ba), s.n. [root from Shreve, Ark., Sept. 30, 1926] (Ba), s.n. [root from Shreve, Ark., July 22, 1927] (Ba); R. T. Clausen H.516 (Ba); Everett & Quinn s.n. [N. Y. Bot. Gard. Cult. Pl. R.41-36] (Ba, N); Gilly 213 (N); Moldenke & Moldenke 11884 (N); Quinn s.n. [N. Y. Bot. Gard. Cult. Pl. R.38/36] (N); Servinghaus s.n. [N. Y. Bot. Gard. Cult. Pl. R.51/36] (N); Swift s.n. [N. Y. Bot. Gard. Cult. Pl. R.38/36] (N); Van Melle s.n. [Sept. 10, 1931] (Ba); M. Zimmerman 38 (Ba). North Carolina: L. H. Bailey s.n. [May 17, 1930] (Ba); Whiffen s.n. [October 19, 1938] (Hi--3917). Pennsylvania: R. E. Griffith s.n. (Ky). Spain: Herb. Hort. Reg. Matrit. 7 (Q). Sweden: Herb. Bot. Mus. Lund. s.n. (Lu); Reuterman s.n. [14/8/1886] (Go); K. F. Thedenius s.n. [Aug. 1887] (Pr). Texas: C. C. Albers 35005 (Au). Vermont: Pringle s.n. [Charlotte, 28 Sept. 1879] (Vt). West Virginia: Davis & Davis 1165 (We), 2083 (We). LOCALITY OF COLLECTION UNDETERMINED: Beckwith's Exped. II. 31 (C); Bosc s.n. [Caroline, 1849] (Du--166487); Brendel s.n. (Ur); L. J. Brewster s.n. [Minn. to Kans.] (Bl--42280, Bl--42281);

Collector undesignated 5 (Q), 8 (Q), 9 (Q), 10 (Q), s.n. (Cn); Fremont s.n. [Exped. to Calif.] (C); Herb. W. H. Harvey s.n. (Du-166486); Herb. Linnaeus G.790, S.7 (Ls--type, N--photo of type, Z--photo of type), G.790, S.8 (Ls, N--photo, Z--photo); Herb. Mus. Bot. Stockholm s.n. (S, S, S); Herb. Swartz s.n. (S); Herb. Univ. Ill. 17456 [Plains] (Ur); Herb. Univ. Kentucky s.n. (Ky); McCord s.n. (Cn); Rugel s.n. [Ad vias et margines agrorum, per Georgiam infer. et Floridam med., Mart. 1843] (Go); Shearer s.n. [Lower Fordyce Bridge, Lower Wabash Valley, 5/15/1920] (Ur); Thunberg s.n. (S); A. Wood s.n. [Ga. and Fla.] (Pa). MOUNTED ILLUSTRATIONS: Curtis, Bot. Mag. 9: pl. 308. 1795 (N, W), 48: pl. 2200 (N); drawing by Prof. Koehler, donated by B. G. Amend (N); Edwards, Bot. Reg. 23: pl. 1925 (Ba, N--photo, N--photo, Z--photo, Z--photo); Life 24 (14): [62] (N); Mag. Bot. & Gard. 2: pl. 38 (N); Meehan, Fls. & Ferns U. S. 2: pl. 21. 1879 (N, W); Source unknown fig. 14 (N), fig. 25635 (N); H. N. Moldenke, kodachrome slide 457 (Z).

VERBENA CANADENSIS f. CANDIDISSIMA (Haage & Schmidt) Palmer & Steyerm., Rhodora 57: 316. 1955.

Synonymy: Verbena aubletia candidissima Haage & Schmidt ex "V. N.", Rev. Hort. Belg. 26: 76--77, fig. 15. 1900. Verbena aubletia candidissima Hort. ex Stapf, Ind. Lond. 6: 429. 1931. Verbena canadensis var. candidissima Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2210. 1951. Verbena canadensis var. candidissima Haage & Schmidt ex Moldenke, Résumé 360, in syn. 1959.

Bibliography: "V. N.", Rev. Hort. Belg. 26: 76—77, fig. 15. 1900; Stapf, Ind. Lond. 6: 429. 1931; L. H. Bailey, Cat. Florists Handl. Verbenac., mss. 1935; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2210. 1951; Palmer & Steyerm., Rhodora 57: 316. 1955; Moldenke, Résumé 22, 223, 358, 360, & 471. 1959; Moldenke, Résumé Suppl. 2: 3 & 8 (1960) and 3: 37. 1962.

Illustrations: "V. N.", Rev. Hort. Belg. 26: 76, fig. 15. 1900.

This form differs from the typical form of the species in having its corollas white, the center sometimes pinkish, the lobes sometimes whitish and the tube whitish suffused with pale-lilac.

Although originally published as a trinomial in the zoologic manner of subspecies, the name was apparently intended to have varietal rank, as the use of the word "variété" in the discussion by the author plainly indicates. The note is signed "V. N." Dr. Walter Robyns, in a letter to me dated December 12, 1961, says "We have tried to find out from several people in horticulture what these initials would mean but nobody knows." The botanical producer for Haage & Schmidt at this time was Heinemann, so it may well be that the name should be accredited to him since it is said to have been first proposed in the then current

Haage & Schmidt catalogue (which I have not seen). The original statement reads "La variété nouvelle qui est annoncée par MM. HAAGE et SCHMIDT dans leur dernier catalogue....est d'un coloris blanc éclatant."

Sartwell reports that "when growing this is white, or, rather, the center has the least pinkish tinge imagineable; it turns darker by pressing". Steyermark says "the corolla lobes are whitish and the corolla tube is whitish with pale lilac suffused throughout." The form is apparently cultivated in England and Belgium, as is evident from the 1900 and 1951 items in its literature; it is recorded from cultivation in England by me in my "Résumé", page 223 (1959). Bailey (1935) reports that its seeds are offered by Stecklers and by Haage & Schmidt, but those of the former have proved to be V. platensis Spreng., of which V. candidissima Stecklers is a synonym.

Cora Steyermark found the form growing wild on an exposed limestone bluff alongside of a road adjacent to Long Creek, just north of Oasis, in Taney County, Missouri, blooming in April. Palmer & Steyermark (1955) cite three collections not as yet seen by me: C. Steyermark s.n. [T22N, R22W, sect. 3, 10, and 11, April 28, 1949] from Taney County, Missouri.

In all, 3 herbarium specimens have been examined by me.

Citations: TEXAS: Red River Co.: Sartwell s.n. [Red River, white] (Ru--21593). CULTIVATED: New York: Sartwell s.n. [seeds from Red River] (T, T).

VERBENA CANESCENS H.B.K., Nov. Gen. & Sp. Pl., ed. fol. 2: pl. 136 (1817) & 2: 274. 1818 [not V. canescens Chapm., 1860].

Synonymy: Verbena canescens Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 750. 1825. Verbena canescens Kunth ex Schau. in A. DC., Prodr. 11: 548. 1847. Verbena sanescens H.B.K. ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Verbena canescens var. prostrata Don ex Moldenke, Résumé 361, in syn. 1959. Verbena cauesceus H.B.K. ex Moldenke, Résumé 361, in syn. 1959.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl., ed. fol. 2: pl. 136 (1817) & 2: 274 (1818) and ed. quart., 2: 274. 1818; Spreng. in L., Syst. Veg., ed. 16, 2: 740. 1825; Sweet, Hort. Brit., ed. 2, 418. 1830; Hook. & Arn., Bot. Beech. Voy. 156. 1833; Benth., Pl. Hartw. 21. 1839; Walp., Repert. 4: 24. 1845; Schau. in A. DC., Prodr. 11: 548--549. 1847; A. W. Chapm., Fl. South. U. S., ed. 1, pr. 1, 307 (1860), pr. 2, 307 (1865), and pr. 3, 307. 1872; S. Wats., Proc. Am. Acad. Sci. 18: 135--136. 1883; A. W. Chapm., Fl. South. U. S., ed. 2, pr. 1, 307 (1884), pr. 2, 307 (1887), pr. 3, 307 (1889), and pr. 4, 307. 1892; Coult., Contrib. U. S. Nat. Herb. 2: 327. 1892; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1894; Hook. & Jacks., Ind. Kew. 2: 1178 & 1179. 1895; E. D. Schulz, 500 Wild Fls. 178. 1922; Stapf, Ind. Lond. 6: 429. 1931; Perry, Ann. Mo. Bot. Gard. 20: 248, 261, 297, 301--302, & 355. 1933; Moldenke, Prelim. Alph. List Invalid Names 56. 1940; Moldenke, Suppl. List Invalid Names 10. 1941;

Howard S. Gentry, Rio Mayo Pl. [Carnegie Inst. Wash. Publ. 527:] 222. 1942; Moldenke, Alph. List Invalid Names 47 & 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 11, 13, 18, & 101. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 17, 29, & 31—32. 1942; Northcraft, Contrib. Dudley Herb. 3: 310. 1944; Moldenke, Alph. List Cit. 1: 4, 14, 28, 100, 104, 143, 203, 216, 232, & 274. 1946; Moldenke, Phytologia 2: 331. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Alph. List Cit. 2: 393, 479, 497, 527, 558, & 593 (1948), 3: 753, 771, 772, 784, 787, 799, 802, 807, 829, 844, 850, 898, 934, & 963 (1949), and 4: 1071, 1075, 1076, 1109, 1129, 1166, 1211, 1246, 1289, 1291, & 1295. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 19, 23, 32, & 197. 1949; Moldenke, Inform. Mold. Set 49 Spec. 3. 1954; J. & G. C. Rzedowski, Act. Cientif. Potos. 1: 39. 1957; Moldenke, Am. Midl. Nat. 59: 356. 1958; Moldenke, Résumé 24, 28, 39, 360, 361, 365, 373, & 471. 1959; Moldenke, Résumé Suppl. 2: 3 & 11 (1960), 3: 7 & 37 (1962), and 4: 14. 1962.

Illustrations: H.B.K., Nov. Gen. & Sp. Pl., ed. fol., 2: pl. 136. 1817.

Low, coarse, perennial herb of spreading habit, often with the aspect of Myosotis, sometimes prostrate, usually 15—46 cm. tall, canescent-hirtous throughout, much branched; stems several, tetragonal, branched, procumbent or decumbent to ascending or erect, canescent-hirsute; branches slender, sulcate, about 15 cm. long, rarely almost simple; leaves rigid, mostly sessile, gray-hairy, oblong-lanceolate, 1--5 cm. long, acute at the apex, remotely incised-dentate or subpinnatifid, contracted or attenuate into a margined and entire semiamplexicaul or petiolar base, lineate-rugose and hirtellous above, the hairs often with minute bulbous bases, canescent-hirsute and somewhat conspicuously veined beneath, revolute along the margins, the laciniations spreading and acute; spikes sessile or short-pedunculate, mostly solitary, filiform-elongate, weak, 5--7.5 cm. long, loose-flowered or compact, glandular-hirsute; lower bractlets often filiform, the upper ones lanceolate, acuminate, variable in length, often slightly surpassing the calyx or rarely subequaling it, canescent-hirsute, with glanduliferous hairs intermixed, ciliate; flowers small; calyx 2--3 mm. long, canescent-hirtous, with glanduliferous hairs intermixed, subtruncate, the herbaceous veins extending into very short inconspicuous mucros or teeth; corolla varying from blue, deep-blue, lavender-blue, lavender, or bluish-lavender to blue-purple, pinkish-purple, purple, mauve, mauve-purple, or purple-violet, its tube slightly longer than the calyx, its limb 4--6 mm. wide, villous in the throat, the lobes retuse at the apex; nutlets subequaling the fruiting-calyx and included by it; cocci subcylindric, about 2 mm. long, raised-reticulate above, longitudinally striate at least halfway from the base to the apex, the commissural faces muricate-scabrous, not reaching the tip of the cocci.

The species is based on a collection made by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland

in Guanajuato, Mexico, and is no. 11141 in the Willdenow Herbarium. Schauer (1847) describes the bractlets of this species as lanceolate or ovate and says further "spicae....in aliis inferius remotiflorae bracteisque foliaceis interstinctae, in aliis pedunculatae bracteis et infimis integerrimis et nunc omnibus calycem excedentibus nunc imis tantum calyce paulo longioribus superioribus vero eumdem modo aequantibus." This is obviously a mixture of the characters of typical V. canescens and of its variety roemeriana (Scheele) Perry.

In its typical form, this species has been found by collectors on barren or dry calcareous hills, rocky limestone valleys, llanos, benches in arroyos, and loam or grassy slopes, in wet sandy or sandy clay loam, on roadside banks and in moist depressions, in cedar savannas and in cactus-acacia grassland with coarse rocky soil, in sandy loam bottoms, in scrubland on limestone mountainsides, on cliffsides along arroyos and on conglomerate banks in deserts, and in clayish soil in desert scrub, growing at altitudes of 170 to 2665 meters. It has been collected in anthesis and fruit from February to November. In Lundell's "Flora of Texas" it is said to be found "in sand and rocky places on dry calcareous hills, valleys, and canyons, blooming from April to October. McVaugh found it on brush-covered hills among shrubs and small trees of Acacia, Mimosa, and Opuntia. Runyon reports it as being "common on mountainsides". Stanford, Retherford, & Northcraft say that it is found "on valley floor sparsely covered by Yucca and Larrea"; Muller found it "abundant in large colonies" in Nuevo León, while Mueller & Mueller report it as "sparse" in the same state. Wiggins encountered it on "limestone slopes in badly eroded area, prostrate along edge of highway pavement" in Puebla. Balls says "flowers mauve-purple, drying to blue, 1/4 inch in diameter; gray-hairy leaves; broad spreading habit to 18 inches long; open limestone hillsides, among scant grass and shrubs." In Texas, according to Williges, it is occasional in caliche outcroppings [of San Patricio County], frequent on undisturbed caliche, occasional in the pits, while Johnston describes it as "very abundant" in Presidio County.

Specimens have been misidentified and distributed in herbaria as V. bracteosa Michx., V. canescens var. roemeriana (Scheele) Perry, V. gracilis Desf., V. neomexicana A. Gray, V. neo-mexicana A. Gray, V. neo-mexicana (A. Gray) Small, V. plicata Greene, V. remota Benth., and V. xutha Lehm. The Moore & Wood 4134 is a mixture with V. menthaefolia Benth.

On the other hand, the H. H. Bartlett 10186, G. L. Fisher 235, Heard, Webster, & Barkley 14509, A. A. Heller 1732, L. C. Hinckley 1254, Lindheimer 1074 & III.500, Edw. Palmer 1044, Rozynski 13, Stanford, Lauber, & Taylor 2252, Tweedy 113 & 246, and M. S. Young 112, all distributed as V. canescens, are actually var. roemeriana (Scheele) Perry; Pataky s.n. [Fort Huachuca, 1890] and Pringle s.n. [Gardiner's Spring, June 25, 1882] are V. gracilis

Desf.; L. F. Ward s.n. [Hearne, Sept. 11, 1877] is partly V. halei Small and partly V. xutha Lehm.; A. M. Ferguson s.n. [April 1901], Parry, Bigelow, Wright, & Schott s.n. [Valley of the Rio Grande below Doffana], and S. S. White 2202 are V. neomexicana (A. Gray) Small; McKelvey 2046, C. H. Mueller 2391, Purpus 3408 & 3927, Tharp s.n. [March 21, 1932], S. S. White 2168, and E. Wilkinson s.n. [Sta. Eulalia hills, July 30, 1885] are V. neomexicana var. hirtella Perry; M. E. Jones s.n. [Aug. 31, 1903] & s.n. [Skull Valley, April 28, 1903], Pringle 270, Shreve 9097, Stanford, Retherford, & Northcraft 426, J. J. Thornber 8111, E. Wilkinson 37, and T. E. Wilcox s.n. [Fort Huachuca, Aug. 1892] are V. neomexicana var. xylopoda Perry; Havard s.n. [Guadalupe Mts., Oct. 1881] is V. perennis Wooton; M. E. Jones 28298 is V. quadrangulata Heller; S. G. Stokes s.n. [Grand Junction, June 15, 1900] is V. bracteata Lag. & Rodr.; and F. Salazar s.n. [Nopala, Aug. 1, 1913] and Shreve 8044 are V. gracilis Desf.

The species is placed by Walpers (1845) in Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Micranthae, Secondary Subgroup Schizophyllae, along with V. xutha Lehm., V. radicans Gill. & Hook., V. microphylla H.B.K., V. gracilis Desf., V. officinalis L., V. supina L., V. bracteata Lag. & Rodr, and what is now called Hierobotana inflata (H.B.K.) Briq.

Briquet (1894) speaks of a "V. neo-mexicana Briq." which he says is "V. canescens x officinalis", by which I assume that he means V. neomexicana (A. Gray) Small, but I do not regard this taxon as a hybrid.

The name V. gracilis Desf. is given as a synonym of V. canescens by Schauer (1847), by Hooker & Jackson (1895), and by me (1940, 1942, 1959), but this is erroneous. Verbena gracilis is a distinct, although closely related, species. Schauer and Hooker & Jackson also cite V. remota Benth. as a synonym of V. canescens, and the two latter authors dispose similarly of V. parviflora Ruíz, but these two names belong in the synonymy of V. gracilis. The Coulter (1892) reference cited in the bibliography above is sometimes erroneously given as page "587" and dated "1894", and the Bentham (1839) referebce as "1846". It appears also that, in spite of the title page date of "1817" on the H.B.K. reference, the text page appeared first in 1818, while only the illustrative plate was issued in 1817.

It should be noted here that the V. canescens Chapm. is V. bracteata Lag. & Rodr., V. canescens var. arizonica Gray is V. neomexicana var. xylopoda Perry, and V. canescens var. neomexicana Gray is V. neomexicana (A. Gray) Small.

A common name recorded for the plant is "canescent vervain". Williges note on his no. 427 "probably the same as no. 333, but

the fruits seem to be spaced farther apart and the calyx looks smaller, and the red lines on the calyx seem to be different." Stanford, Retherford, & Northcraft 486 appears to be a mixture with V. perennis var. johnstoni Moldenke, while their no. 498 as well as Waterfall & Wallis 13806 are mixtures with V. ciliata Benth. The 498 collection, cited hereinafter from Zacatecas, may actually have come from Coahuila -- its label reads "15 kilo west of Concepcion del Oro on the Coahuila-Zacatecas border, lat. 24°54' N. long. 101°45' W." The town referred to is in the state of Zacatecas and this state's territory extends for a considerable distance west and a fair distance north of the town, so the chances are that the collection was made in that state. Howard S. Gentry 557m, cited below from Chihuahua, is from Mesa Colorado on the Sonora-Chihuahua boundary and so may very well actualy have come from Sonora. In his "Rio Mayo Plants" (1942) Gentry lists this collection as "Verbena sp." and cites it along with his nos. 1522 and 1923 (which are V. pinetorum Moldenke) and no. 1758 (which I have not seen as yet). He says that they inhabit "Open slopes and meadow margins in Pine Forest. 4000--6000 feet. Perennial cespitose herb, with blue flowers in summer. Occurs infrequently on Sierras Chacuro and Canelo." Schauer (1847) cites Berlandier 170, 2054, and 2247 from Tamaulipas, not yet seen by me, as well as Hartweg 174, which, however, is the type collection of V. remota and is therefore V. gracilis. He saw these collections in the Berlin herbarium, now destroyed.

Perry (1933) cites the following 27 additional specimens not as yet seen by me: MEXICO: Aguas Calientes: Hartweg 177 (G); Rose & Painter 7741 (G). Coahuila: Adole 22 [Arsène 10626] (E, F, G); Gregg 99 (E), 246 (E), 545 (E), 740 (E); Edw. Palmer 25 (E, F, G), 1047 (D, G). Oaxaca: Pringle 4784 (D, E, G); L. C. Smith 412 (G). San Luis Potosí: Purpus 5515 (F, G); J. G. Schaffner 719 (D, G). Vera Cruz: Seaton 322 (F, G). Zacatecas: Edw. Palmer 303 (E, F, G). It is worth noting that she cites all the Gregg specimens from Coahuila, including the Buenavista and San Pablo collections which I cite hereinafter as from Chihuahua and Sonora respectively. It is very probable that there are towns bearing these names in various states of Mexico. She says of the species "This is a low foliose species closely related to V. neomexicana and V. plicata, but distinguished from them by the semiamplexicaul elongate leaves and rather characteristic compact habit. The specimens cited from Coahuila are excellent examples of phases intermediate between the species and the variety. The collection from Nevada seems somewhat out of range. Possibly it was carried in as a weed or escaped from cultivation."

In all, 155 herbarium specimens have been examined by me.

Citations: NEVADA: Lincoln Co.: M. E. Jones 554 (Po--246536). TEXAS: Bandera Co.: Johnson & Webster 566 (Au--121910). Bexar Co.: Metz 3019 (St). Brazos Co.: Reeves 206 (Cs). Guadalupe Co.: John-

ston & McCart 5096 (Au--121953). Presidio Co.: M. C. Johnston 3452 (Au--168707). San Patricio Co.: Williges 286 (Au--179721), 333 (Au--179805), 427 (Au--179846). Willacy Co.: M. C. Johnston 53253.4 (Au--122428). County undetermined: Mrs. G. A. Black s.n. [G. A. Black 37-6880] (Be--47582). MEXICO: Aguas Calientes: Hartweg 177 (N); R. McVaugh 16639 (Mi); Rose & Hay 6212 (N, W--396025); Rose & Painter 7741 (N, W--451358). Chihuahua: Howard S. Gentry 557m (Mi); Gregg s.n. [San Pablo, 29/47] (T); E. Wilkinson s.n. [30 July 1885] (I), s.n. [Santa Eulalia Hills, Sept. 19, 1885] (Ca--192070). Coahuila: Adole 22 [Arsène 10626] (Bm, Cm, N, Ur, W--1030229); Barkley, Webster, & Rowell 7189 (Au--170081); Hinton 16636 (W--1947239); Johnson & Barkley 16259M (Au); Kenoyer & Crum 2879 (Mi), 2951 (Mi); E. G. Marsh 278 (Ok), 575 (Ok), 1687 (St), 2140 (St); R. McVaugh 12310 (Mi); Edw. Palmer 25 (Me, N, S, W--336010), 1047 (Pa, W--56194, W--1323141); F. W. Pennell 17305 (Me, Me, N, N, W--1640495); R. Runyon 1321 (W--1474119); Stanford, Retherford, & Northcraft 426 (Du--286419, Tu--10892), 486, in part (Du--288703, N), 498 (Ca--713893); Warnock & Barkley 14852 (Ca--747842), 14852M (Au). Guanajuato: Spivey 151 (Ca--916748). Hidalgo: V. H. Chase 7112 (Ur, Ur); O. M. Clark 7059 (N); Hoogstraal & Chase 7112 (Ld); Moore & Wood 4134, in part (Ba); Rose, Painter, & Rose 8971 (W--452453), 9162 (W--452645). México: Matuda 26638 (Cb), 29341 (Z); Paxson & Barkley 16M839 (Au, N). Nuevo León: Abbón 6310 (Br); V. H. Chase 7753 (Ld, Oa, Ur); M. T. Edwards 49 (S); Fernandez C. & Barkley 14507a (N); Frye & Frye 2384 (Se--65801, W--1790997); Heard, Webster, & Barkley 14509 (Au); C. H. Mueller 2305 (N); Mueller & Mueller 465 (Mi), s.n. [Mayo 19, 1934] (Me); F. W. Pennell 16792 (D--733972, W--1640232), 16881 (D--733973, W--1640299); Waterfall 15325 (Ok); Waterfall & Wallis 13217 (Ok). Oaxaca: C. Conzatti 4194 (Me, W--1082260), 4288 (Me, W--1082312), 4992 (W--1696339); Galeotti s.n. [Tlajiaco, Juin 1844] (Br); Pringle 4784 (Br, C, Ca--104814, Cm, Io--38732, Me, Me, Mi, Mm--15391, S, Vt, W--251676); C. L. Smith 221, in part (Ca--975386, N). Puebla: Arsène s.n. [15/6/1907] (Br); Balls 5266 (W--1793806), B.5266 (Ca--684513); Chute M.163 (Mi); Nicolas 80 (Gg--31273), s.n. [Cerro Guadalupe, 20/6/1909] (W--464379), s.n. [Rancho Posadas, 20/6/1909] (Br, Br), s.n. [Atoyac, 20/6/1910] (W--464380); H. Pittier 414 (W--570809); Wiggins 13261 (Du--404631). San Luis Potosí: G. L. Fisher 3729 (W--1725438), 37029 (Ew, Ew), s.n. [Cardenas, Aug. 21, 1937] (Fs, N); Parry & Palmer 715 (Io); Purpus 5515 (Ca--157217, N, W--464001); J. G. Schaffner 719 (Me); Shreve 9344 (Ca--731688, Fs, Mi). Sonora: Gregg s.n. [Buenavista, 22/47] (T). Tamaulipas: Graham & Johnston 4707 (Au--

174972); Painter & Barkley 14373 (Au); Rose & Russell 24317 (W--1369606); Rozynski s.n. (B); Stanford, Lauber, & Taylor 2174a (N), 2252 (N); H. W. Viereck 229 (W--1687119). Vera Cruz: L. I. Davis 203 (N); F. Müller 1215 (M); H. E. Seaton 322 (W--56175). Zacatecas: Howard S. Gentry 8555 (N, W--2022211); Edw. Palmer 303 (N, W--471173); Purpus 467 (W--470278), 469 (Ca--138833); Stanford, Retherford, & Northcraft 498, in part (N, N, Se--70451); Waterfall 15570 (Ok); Waterfall & Wallis 13806, in part (Ok). State undetermined: Galeotti s.n. (Br, Br); Halsted s.n. [Mexico] (T).

VERBENA CANESCENS var. ROEMERIANA (Scheele) Perry, Ann. Mo. Bot. Gard. 20: 302. 1933.

Synonymy: Verbena roemeriana Scheele, Linnaea 21: 755. 1848. Verbena cauesceus var. roemeriaua (Scheele) Perry ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena canescens var. roemeriana (Gray) Small ex Moldenke, Résumé 361, in syn. 1959. Verbena cauesceus var. roemeriana (Scheele) Perry ex Moldenke, Résumé 361, in syn. 1959. Verbena canescens roemeriana (Scheele) Perry ex Rzedowski, Act. Cientif. Potos. 4: 44, 65, & 91. 1961. Verbena texana Small ex Moldenke, Résumé Suppl. 3: 41, in syn. 1962.

Bibliography: Scheele, Linnaea 21: 755. 1848; Hook. & Jacks., Ind. Kew. 2: 1179. 1895; E. D. Schulz, 500 Wild Fls. 178. 1922; Perry, Ann. Mo. Bot. Gard. 20: 261, 262, 294, 296, 302--303, 355, & 356. 1933; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Moldenke, Prelim. Alph. List Invalid Names 48. 1940; Moldenke in Lundell, Fl. Texas 3 (1): 17 & 32--33. 1942; Moldenke, Alph. List Invalid Names 50. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13, 18, & 101. 1942; Moldenke, Castanea 10: 39. 1945; Moldenke, Am. Journ. Bot. 32: 610. 1945; Moldenke, Phytologia 2: 87, 114, & 127 (1945) and 2: 161. 1946; Moldenke, Alph. List Cit. 1: 4, 13, 16, 32, 38, 47, 89, 108, 109, 111, 115, 119, 125, 126, 138, 154, 178, 203, 216, 253, 257, & 269. 1946; Moldenke, Phytologia 2: 328. 1947; Moldenke, Castanea 13: 112 & 113. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 79. 1948; Moldenke, Wrightia 1: 228--229. 1948; Moldenke, Alph. List Cit. 2: 370, 396, 470, 474--476, 479, 483, 494--496, 498, 506, 514, 516, 520, 522, 527, 531, 538, 572, 585, 592, & 593 (1948), 3: 656, 664, 665, 678, 680, 681, 683, 707, 708, 715, 719, 722, 723, 729, 742, 752, 773, 784, 785, 789, 790, 796, 798, 806, 809, 824, 831, 837, 843, 850, 878, 879, 881--883, 891, 914, 915, & 934 (1949), and 4: 982, 989--993, 1004, 1014, 1075, 1098, 1099, 1107--1109, 1113, 1118, 1120, 1122, 1129, 1138, 1139, 1145, 1148, 1150, 1151, 1155, 1158, 1162--1164, 1170, 1171, 1182, 1189, 1207, 1212, 1217, 1231, 1238, 1239, 1246, 1253, 1254, & 1289. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 23, 27, 32, & 197. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 12. 1949; Moldenke, Phytologia 3: 73. 1949; Shinners, Spring

Fl. Dallas 326. 1958; Moldenke, Résumé 28, 33, 39, 361, 373, & 471. 1959; Moldenke, Résumé Suppl. 2: 11. 1960; Rzedowski, Act. Cientif. Potos. 4: 44, 65, & 91. 1960; Lewis & Oliver, Am. Journ. Bot. 48: 639--641. 1961; Moldenke, Résumé Suppl. 3: 7, 37, & 41 (1962) and 5: 4. 1962.

Illustrations: Lewis & Oliver, Am. Journ. Bot. 48: 640. 1961.

This variety differs from the typical form of the species in being more densely hirsute, sparsely (if at all) glandular, the floral bractlets broadly ovate at the base, abruptly acuminate at the apex, concave during anthesis, later slightly recurved, mostly surpassing the calyx, the dorsal surface of the cocci reticulate-scrobiculate for approximately 2/3 of their length, striate toward the base, and the cocci themselves usually more slender.

Collectors describe the plant as a small prostrate annual or a low, erect, branched, bushy-spindly, perennial herb to 30 cm. tall; bark pale or gray; roots fibrous; leaves oblong in outline, pinnatifid, canescent; flowers odorless, in terminal spikes, open in the morning; corolla varying from blue, lavender-blue, blue-purple, blue-violet, or bluish-lavender to purplish, purple, purplish-blue, pinkish-purple, or lavender with a whitish "eye"; chromosome number: n = 7, 2n = 14.

The variety is found in dry rocky or sandy soil on clay slopes and hillsides, in ravines and open woodlands, and in dry cedar brakes, fields, pastures, and on calcareous or blackland prairies, showing a preference for dry rocky hillsides, in Texas, blooming there from February to October (mostly from March to June), and is widespread in central, southern, and western parts of the state from Jeff Davis and Reeves to Kinney and Cameron Counties, east to Wharton and Waller, and north to Wichita and Scurry Counties. Collectors have found it also in dry limestone or clay soil, black or dry calcareous soil, in deserts and arroyo bottoms, in sandy loam bottoms or in clay-loam soil, on limestone knolls and hills, in moist or dry open ground, along gravel bars, in dry rocky ground along small streams, on gravelly hills and granite outcrops, along roadsides and railroad rights-of-way, on creek banks and limey-clay hillsides, near ponds, among rock and gravel in xerophytic canyons, in open woodland uplands, in cultivated or waste fields, limestone rock and gravel soil, or chaparral, on forested hills and rocky hilltops, in rocky limestone valleys, among coarse gravel and alluvium, in wet ravines and desert scrub, in scrub on ridges, and in xeric scrubland and limestone-clay loam.

Clemens & Clemens say that in Texas it inhabits the Tropical Life Zone; Warnock found it "infrequent on cemetery knoll" in Hays County and "frequent on limestone hills" in Comal County, while Runyon reports that it is "frequent in dry situations throughout the [Rio Grande] valley" and "frequent in open woodlands" in Cameron County and "in open woodlands and slopes in clay soil, frequent in clay slopes and hillsides in Hidalgo and Starr Counties." Johnston says that it grows in "shallow sand over caliche in short brush-Calliandra eriophylla association" in Live Oak County. Stanford, Lauber, & Taylor aver that it is found

in "extremely dry areas, old fields" in Tamaulipas, while Waterfall found it in a "flat valley with acacias and other shrubs" in Coahuila and "on gravel desert with Larrea and Fouquieria" in Chihuahua. Traverse found it in deep low scrub on buff-gray silt in Celtis spinosa complex; the Websters encountered it on xeric limestone hillsides; Graham & Johnston in brush with Acacia rigidula Benth. on marly hills and on caliche spots; and M. C. Johnston in shallow sand over caliche in short brush-Calliandra eriophylla association. Johnston & McCart report it as growing in Schizachyrium scoparium prairie with scattered live oaks and junipers in shallow brownish calcareous clay-loam with much limestone gravel on gentle slopes. McVaugh says that it is "abundant and weedy" on rocky limestone hills in Val Verde County, Texas.

It has been collected in anthesis and fruit from February to December. It is most probable, therefore, that it flowers and fruits throughout the year. It has been collected at altitudes of 1.2 to 1450 meters.

Material of this variety has been misidentified and distributed in herbaria under the names of V. bracteata Cav., V. bracteosa Michx., V. bracteosa var. brevibracteata Gray, V. canadensis (L.) Britton, V. canescens H.B.K., V. caroliniensis (Walt.) Gmel., V. cloveri Moldenke, V. hastata L., V. imbricaria Woot. & Standl., V. neomexicana (A. Gray) Small, V. neomexicana Small, V. neo-mexicana (A. Gray) Small, V. neo-mexicana Small, V. neomexicana var. hirtella Perry, V. neomexicana var. xylopoda Perry, V. officinalis L., V. plicata Greene, V. urticaefolia L., V. xutha Lehm., and even Phyla sp.

On the other hand, the Warnock & Barkley 14852 and Waterfall & Wallis 13217, distributed as V. canescens var. roemeriana, are actually typical V. canescens H.B.K.; Hamby 1637 is V. cloverae Moldenke; Bryant & Bryant 3 is V. halei Small; Owens 3125 is V. neomexicana var. xylopoda Perry; and Tharp 43-801 is V. plicata Greene.

The variety is named in honor of Karl Ferdinand Roemer (1818--1891), German professor of geology and paleontology at Breslau, who collected it and wrote on the paleontology of Tennessee and Texas. Common names reported for it are "verbena", "vervain", and "wild verbena" -- names which, however, are widely applied to the genus as a whole, as well as to many other species and varieties in it and even in related genera (see under V. bonariensis).

The Hinckley, Warnock, & Tharp s.n. [8/22/47] collection is very glandular and looks like a form of V. neomexicana, but its bractlets are very large and broad! Perhaps it represents a hybrid. Bray, Ramsey, Beck, Long, Wild, & Ferguson suggest that their collection, cited below, "may be a stout form of V. canescens." Warnock s.n. [May 3, 1937], J. Reverchon 737, and Tharp 43-800 are mixtures with V. plicata Greene, Parry, Bigelow,

Wright, & Schott 827 is a mixture with V. xutha Lehm., while G. Jermy 87 and M. S. Young s.n. [4/5/18] are mixtures with V. halei Small.

The Small & Wherry 11969, cited by Perry (1933) and later by me in Lundell's "Flora of Texas" (1942) as from Bexar County, Texas, may actually have come from some other county, because its label merely states "San Antonio to Austin" and Dr. Small's original field book gives no further information about it. Whitehouse s.n., cited from Menard County, may have come from Concho, McCulloch, or Mason Counties since its label merely says "Mason--Eden", but the collector tells me that it was "probably" collected in Menard County. Similarly, Tharp 8588, cited from Terrell County, may be from Val Verde County -- the label is merely inscribed "Langtry--Dryden", but Dr. Tharp, in a letter to me, says "probably in Terrell County". Lindheimer 1074 was apparently not collected in Comanche County, as some workers have thought, but in Comal County, because "New Braunfels" is definitely underlined on the label of the University of Texas sheet. The "J. F. Norman" appearing on labels in the same herbarium is apparently an error in transcription for J. F. Normand. Tharp s.n. [June 19], Ecology Class Univ. Texas s.n., and Painter 249 were cited in Lundell's "Flora of Texas" as V. neomexicana var. hirtella, but prove to be V. canescens var. roemeriana instead.

Perry (1933) cites the following 47 additional specimens not as yet seen by me: TEXAS: Bexar Co.: Clemens & Clemens 974 (E); Groth 16 (F, G); E. J. Palmer 9183 (E). Blanco Co.: E. J. Palmer 13283 (E). Brown Co.: E. J. Palmer 29535 (E); J. Reverchon 1961 (G). Comal Co.: Lindheimer 294 (E), 1074 (E, F, G). Duval Co.: Clark 4041 (E). Gillespie Co.: Jermy 182 (E). Goliad Co.: Eggert s.n. [near Goliad, 9 April 1900] (E). Hays Co.: Trelease s.n. [San Marcos, 6 Nov. 1897] (E). Kerr Co.: A. A. Heller 1732 (E, G); E. J. Palmer 10002 (E). Real Co.: Berlandier 644, in part (G), 2054 (G). San Patricio Co.: McKelvey 1710 (G). Terrell Co.: M. E. Jones 26226 (E). Tom Green Co.: Reverchon 3903 (E). Travis Co.: E. Hall 430 (E, F, G); M. S. Young 112 (E). Uvalde Co.: Moore & Steyermark 3005 (E); E. J. Palmer 13563 (E), 33605 (E). Val Verde Co.: Eggert s.n. [Devil's River, 10 Sept. 1900] (E); Orcutt 6111 (E). County undetermined: Lindheimer 500 (E, G); Reverchon 737, in part [1885] (E). MEXICO: Nuevo León: Gregg 791 (E); Edw. Palmer 1044 (D, G); Wislizenus 325 (E). Tamaulipas: Berlandier 827 (E, G); Edw. Palmer 82 (E, F, G); Rozynski 13 (F), 17 (F), 135 (F). She comments that the variety is "Differing from the species chiefly in its coarser less glandular pubescence and the broadly ovate abruptly acuminate bracts. A few of the above-cited specimens show transitional phases, but, as a whole, are closer to the variety". The "Berlandier 827" which she cites is inscribed "834-

827" in the Torrey Herbarium. Her "Canby 194" is cited hereinafter as Canby, Sargent, & Trelease 194.

In all, 458 herbarium specimens of the variety have been examined by me.

Citations: TEXAS: Bandera Co.: Bogusch s.n. [April 10, 1926] (Ob--50813); V. Sutton s.n. [Medina, 10.12.1929] (Au). Bee Co.: J. S. Williams 39378 (Au). Bell Co.: McDaniel 12 (Nt); Wolff 539 (W--1623900), 3484 (Tr); York & York 54448 (Au--121903). Bexar Co.: R. Bebb 2251 (Ok, Ur); Bogusch s.n. [April 16, 1925] (Ob--50813); Clemens & Clemens 971 (Gg--37132, Po--69594), 972 (Po--69598), 973 (Ba, Mi, Po--69592), 974 (Ba, Po--69602), s.n. [San Antonio, April 22, 1911] (N); Groth 16 (N, W--717636); G. Jermy 87, in part (W--315686), s.n. [San Ant.] (N, W--392396, Wi, Wi); J. Jermy s.n. [Bexar Co., 1903] (N); Mauldin s.n. [May 1, 1941] (Bl--42332); Metz 76 [Aug. 21] (I), 76 [Aug. 24] (I), 881 (I), 2478 (N), s.n. [July 17, 1931] (N); H. N. Moldenke 6981 (N); E. J. Palmer 9183 (Du--205598, W--1531892); F. W. Pennell 10358 (N, Rf); E. D. Schulz 526 (W--1074950, Wi), s.n. [Classen Ranch, May 1938] (Wi, Wi); Texas Agr. Exp. Sta. Herb. Exchange 3496 (Hp); Whelan 176 (N). Brewster Co.: Berkman 3683 (Au); G. W. Brown B. 102 (Au); Goodman & Waterfall 4581 (Ok, St); Hinckley 4614 (W--1972322); Hinckley, Warnock, & Tharp s.n. [8/22/47] (Au); Lewis & Oliver 5456 (Nb); Tharp 253 (W--1873782), s.n. [6/19/31] (N), s.n. [10-9-36] (Au, Au, Ca--882669, Mi, Pl--151576, Sm); Warnock s.n. [May 3, 1937] (Au). Brooks Co.: Perkins & Hall 2637 (Mg--51, Po--256895). Brown Co.: J. Reverchon 737, in part (W), s.n. [Curtiss 1961] (Bc, C, Cm, Ka, Pa). Cameron Co.: C. L. Lundell 10702, in part (Sm), 10774 (N, Rf, W--1926935); Lundell & Lundell 10023 (Ld, N), 10760 (Sm); R. Runyon 337 (Au, Au, Au), 629 (Rr, W--1224222), 1532 (N), 1778 (Rr), 1779 (Rr, Rr), 2186 (Rr), 2492 (N, N, N), 2518 (N, N); Tharp 1873 (Au); Tracy s.n. [Olmito, 4/15/05] (Tr); Traverse 1093 (Au--179278). Coleman Co.: Warnock 46334 (Au, N). Comal Co.: C. C. Albers 38004 (Au); Lindheimer 294 (Ka), 1074 (Au, Br, Ca--147486, Me, Me, N, Ok--10349, Up--48539, W--502447); B. H. Warnock 46244 (Au, Au, N, N, Ok, S, St). Coryell Co.: Johnston & McCart 5409 (Au--121955). Crockett Co.: M. E. Jones 26222 (Po--178341); Warnock & McBryde 15175 (Rf). Dallas Co.: Collector undesignated s.n. [Highland Park, 3-29-19] (Wi). Dimmit Co.: Cory 29418 (N), 29419 (N). Duval Co.: Ripley & Barneby 9027 (N); Tharp 5903 (Au). Edwards Co.: Cory 9034 (Fs); M. E. Jones 26223 (Po--178346); Parks & Cory 20841 (Tr--16189); Shreve 9928 (Fs). Gillespie Co.: Whitehouse s.n. [near Fredericksburg, June 6, 1929] (Au). Guadalupe Co.: Wagner & Barkley 16T438 (Au, N). Hays Co.: G. L. Fisher 67 (W--1104872); Lundell & Lundell 10278 (Ld, N); S. W.

Stanfield s.n. [San Marcos, 1898] (N); B. H. Warnock 46538 (Au, N, N). Hidalgo Co.: Cameron 239 (Au), 245 (Au); Clover 1839 (Mi); Lundell & Lundell 9819 (Ld, N); R. Runyon 2733 (N, N, N, N); Mrs. E. J. Walker 30 (Au, N), 34 (Au, Au), 49 (Au, N), s.n. [Feb. 9, 1942] (Au, Au, N); M. L. Walker 66 (Au). Howard Co.: Havard s.n. [w. of Big Spring, Sept. 1881] (W--221212). Jeff Davis Co.: M. E. Jones 26224, in part (Po--178345); M. S. Young s.n. [Davis Mts., 9/5/18] (Au). Jones Co.: B. Adams 22 (Nt). Karnes Co.: J. C. Johnson 1525 (Z). Kendall Co.: Parks & Cory 12929 (Tr--16185). Kerr Co.: A. A. Heller 1732 (C, Ca--104815, Mm--15395, W--213442); Milligan s.n. [Kerrville, May 1898] (W--504334); E. J. Palmer 10002 (Du--205613, S, W--1532015). Kinney Co.: D. S. Correll 11905 (Rf); Mearns 1237 (W--229621), 1335 (W--229609), 1456 (W--230088); A. R. Moldenke 175 (Fg). Kleberg Co.: Bogusch S.61 (W--2003647); R. Runyon 4283 (N, Sm); Tracy & Ness s.n. [Kingsville, 4/10/1905] (Tr). Live Oak Co.: M. C. Johnston 542054 (Au--121920, St). Llano Co.: Correll & Correll 12701 (Sm); Wolff 3064 (Tr--16140). Mason Co.: Dapprich 7766 (Sm); Westlund 85 (Au). Medina Co.: C. L. Lundell 10986 (N, Rf); Small & Wherry 11980 (N). Menard Co.: Whitehouse s.n. [Mason-Eden, 8.31,1929] (Au). Mills Co.: Egg s.n. [Mullin, Apr.-May 1931] (Au). Nolan Co.: Herb. Univ. Texas s.n. [Sweetwater, 5-20-1931] (Au). Pecos Co.: Tharp 43-800, in part (Au, St); Warnock & McBryde 11908 (Rf). Presidio Co.: Hinckley 1254 (N, N), 2709 (N), 3218 (N). Red River Co.: Gregg 791 (T). Reeves Co.: Tharp s.n. [Pecos, 6.14.31] (Au). Runnels Co.: Lundell & Lundell 10162 (Mi, N); Quillin s.n. [Ballinger, 5/24/31] (Wi, Wi). San Saba Co.: Wolff 4238 (Tr). San Patricio Co.: McKelvey 1710 (W--1581393). Scurry Co.: B. B. Harris s.n. [7-4-27] (Nt). Starr Co.: D. S. Correll 11887 (Rf, Rf); Ecology Class Univ. Texas s.n. [2.28.30] (Au); Lundell & Lundell 9796 (Ld, N, W--1887595), 9930 (Ld, N, W--1874487); R. Runyon 2559 (N, N). Sutton Co.: Babcock s.n. [Cory 27780] (N); O. Degener 5078 (N); G. L. Fisher 50101 (Ew); R. W. Pohl 4760 (Sm); Rohrbaugh 385 (Ok). Terrell Co.: M. E. Jones 26226 (Po--178348); Tharp 8588 (Au). Tom Green Co.: F. W. Pennell 10504 (N); C. Smith 19 (Ok), 143 (Ok); Tweedy 113 (W), 246 (W--147571), s.n. [1879] (T). Travis Co.: Adamcik & Barkley 16T240 (Au, N); C. C. Albers 32016 (Au), 34009 (Au); Albers, Barkley, & Warnock 46455 (Au, N); Armer 5379 (Au, W--1438993), s.n. [Austin, 4-2-29] (N); Barkley & Rowell 41 (Au), 42 (Au, N), 7061 (Au); Bogusch 766 (W--1285721); Bray 100 (N); Bray, Ramsey, Beck, Long, Wild, & Ferguson s.n. [mouth of Bell Creek, Oct. 12, 1900] (Au); Cohn & Barkley 13148 (N), 15148 (Au); E. Hall 430 (N, Pa, Po--69310, W); Johnson & Barkley 16T498 (Au); Johnson & McCart 4057 (Hi--

117747); Lundell & Lundell 8860* (Mi), 8876 (Ld, Mi, N, N); Mc Williams 4639 (Au); R. H. Painter 249 (Au), 392 (Au, Ky--2716); C. M. Rogers 6726 (Au--121937); Rowell & Barkley 16T214 (Au, N), 16T245 (Au, N); Rowell & Mann 13 (Au); R. Runyon 1532 (S); Tharp 44099 (Au, N), s.n. [Austin, 5/27/20] (Ca--882668, Po--161330, Ur), s.n. [Austin, Spr. 1934] (Au), s.n. [11-17-39] (Ca--882667, Sm), s.n. [7-18-40] (Au, Au, N), s.n. [7-19-40] (Au); Tharp, Barkley, & Warnock 46271 (Au); B. H. Warnock 86 (Au, N), 46272 (Au), 46445 (Au); Webster & Webster 115 (Au--121947); M. S. Young 112 (Ca--882626, Ur), s.n. [10/10/13] (Au), s.n. [Mt. Bonnell, 11/22/13] (Au), s.n. [Austin, 4/25/14] (Au), s.n. [4/29/14] (Au), s.n. [Austin, 4-1-1918] (Au, Mi, Mi, Mv, N), s.n. [4/5/18] (Au). Uvalde Co.: M. E. Jones 28292 (Po--187974), 28296 (Po--188286, Po--188287); C. L. Lundell 10956 (N, Rf), 10972 (N, Rf, W--1926938); Lundell & Lundell 10264 (Ld, Mi, N, Rf, W--1888913); E. J. Palmer 33605 (N), 33646 (N); H. R. Reed 33818 (N, N). Val Verde Co.: D. S. Correll 14970 (Rf); Hamby 977 (Ar--206763); M. E. Jones 26225 (Po--178347), 28296 (Ca--479298, Gg--237868); Mc Vaugh 10599 (Mi); A. R. Moldenke 174 (Fg); Parry, Bigelow, Wright, & Schott 827, in part (W--56198); Tharp s.n. [Langtry--Dryden, 6-14-1931] (Ca--882670); W. M. Thompson 222 (Au--164496); B. H. Warnock 11238 (Rf); Warnock & McBryde 15046 (Au--123236, Rf), 15101 (Rf). Waller Co.: Normand s.n. [Waller Creek, 4/4/28] (Au). Wharton Co.: Small & Wherry 11826 (N), s.n. [near Wharton, April 12, 1925] (W--1739113). Wichita Co.: Tharp 1361 (W--1114412). Williamson Co.: Bodin s.n. [Georgetown, Dec. 22, 1889] (Ka). County undetermined: G. A. Black 38-6924 (Be--47626); Collector undesignated s.n. (Wi); Herb. Univ. Texas s.n. (Au); Mrs. W. R. Hughes 26 (N); Lindheimer III.500 (Ca--248244, W), s.n. [Southern Texas, 1849--51] (N); Mebane s.n. [Spring, 1926] (Wi); Normand s.n. [Central Texas, June 28, 1927] (Au); Small & Wherry 11969 [San Antonio to Austin] (N); C. Wright s.n. [Texas] (T). CALIFORNIA: San Diego Co.: Edw. Palmer 312 (Pa). County undetermined: Eastwood s.n. [Southern Pacific Railroad, April 1908] (Gg--31314). MEXICO: Chihuahua: Waterfall 12487 (St, Z); E. Wilkinson s.n. [19 Sept. 1885] (Io--92224). Coahuila: Herb. Inst. Biol. Univ. Nac. Mex. 7138, in part (Me, Me); Hernandez Corzo, Rowell, & Barkley 16M500 (Au, N); Johnson & Barkley 16224M (Au), 16260M (Au); Kenoyer & Crum 2587 (Mi); E. G. Marsh 278 (Au), 494 (Au), 1687 (Au); Warnock & Barkley 14852 (N); Waterfall 15302 (St); S. S. White 1759 (Mi); Wynd & Mueller 93 (Fs, I, Me, Me, Mi, N, Ur, Ur, W--1639573), 193 (Fs, I, N, S, St, Ur, Ur, W--1639655), 253 (Fs, I, N, Ok, S, Ur, Ur, W--1639706). Hidalgo:

Pringle s.n. [El Salto, 15 Sept. 1902] (Me, Me). Jalisco: Mearns 1189 (W--228336). Nuevo León: Alonis, Johnson, & Barkley 16185M (Au); Barkley & Barkley 17317M (N); Barkley, Webster, & Rowell 7181 (Au--123252, N); J. T. Buchholz s.n. [Feb. 23, 1936] (Ur), s.n. [Feb. 24, 1936] (Ur); Canby, Sargent, & Trelease 194 (W--369718); L. I. Davis s.n. [Santa Rosa Canyon, April 22, 1946] (Au--172008); Fernandez C. & Barkley 14507a (Au); G. L. Fisher 235 (W--1316044), s.n. [Monterrey, July 26, 1926] (Du--154568, Fs, Hp, Mg--28); Frye & Frye 2362 (Ca--882624, Du--285481, Hp, N, Pl--111152, Rs--25233, Se--65689, W--1790993); Howard S. Gentry 6627 (N), 6727 (Ak--22936, W--1978725); Graham & Johnston 4586b (Au--174597); Heard, Webster, & Barkley 14509 (N, W--2134279); Hernandez Corzo, Rowell, & Barkley 16M53 (Au); Johnson & Barkley 16041M (Mi, Ok, Ur), 160A41M (Au); Lewis & Oliver 5414 (Nb); Mueller & Mueller 155 (Au, Me, Me); Painter, Lucas, & Barkley 14276 (Au); Edw. Palmer 1044 (Pa, W--56192, W--1323067); Salinas, Rowell, & Barkley 16M371 (Au); Tharp 1807 (Au); Webster & Barkley 14493 (Au); S. S. White 1407 (Mi, Oa), 1442 (Mi), 1571 (Mi, Oa, Tu--35535). Tamaulipas: H. H. Bartlett 10186 (Mi, W--1491342), 10610 (Mi); Berlandier 834 (T); Graham & Johnston 4384F (Au--174501); LeSueur 402 (Au); Edw. Palmer 8 (N), 82 (Ca--145769, W--572312), 103 (Cm); Rozynski 13 (Ca--469826, Mi); Stanford, Lauber, & Taylor 2174a (N), 2252 (N, W--2216734); H. W. Viereck 867 (W--1687429).

VERBENA CANIUENSIS Moldenke, Phytologia 4: 128--129. 1952.

Bibliography: Moldenke, Phytologia 4: 121 & 128--129. 1952; Angely, Fl. Paran. 7: 6, 7, & 12 (1957) and 12: 17. 1958; Moldenke, Résumé 110 & 471. 1959; G. Taylor, Ind. Kew. Suppl. 12: 149. 1959; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961.

Small creeping herb; stems procumbent, tetragonal, rooting at the nodes, sparsely strigillose; principal internodes 2.5--4 cm. long, sometimes slightly arched; leaves decussate-opposite, numerous; petioles very slender, elongated, often as long as or longer than the blade, 1--2.5 cm. long, flattened-canaliculate above, sparsely strigillose; leaf-blades rather firmly chartaceous, rather uniformly green on both surfaces, ovate-subrotund, 1--2.5 cm. long and wide, acute at the base or slightly prolonged into the petiole, rounded at the apex, rather coarsely dentate along the margins except toward the very base, rugose above, sparsely strigillose on both surfaces, the teeth acute or rounded; midrib and the 4 or 5 secondaries about equal in diameter, very slender, impressed above, prominulous beneath, ascending, not arcuate; veinlet reticulation sparse and rather obscure; inflorescence terminal, spicate, slender, 7--13 cm. long, rather loosely many-flowered; peduncles very slender, 4--4.5 cm. long, sparsely strigillose with whitish ascending hairs like those on the stems, pe-

duncles, and leaf-blades; rachis very slender, strigillose like the peduncles; bractlets lanceolate, about 2.5 mm. long, equaling or slightly shorter than the calyx, or only 1.5 mm. long and much shorter than the calyx, acuminate at the apex, sparsely strigillose; calyx cylindric, 2--3 mm. long, 5-ribbed, scarious between the ribs, strigillose with ascending whitish hairs on the ribs, 5-apiculate, the lowermost ones often short-pedicellate; corolla hypocrateriform, lilac, its tube very slender, equaling the calyx, the limb about 2 mm. wide.

The type of this interesting species was collected by Gert Hatschbach (no. 2560) in "terreno umido da mata ciliar", Rio Caniú, Palmeira, Paraná, Brazil, on November 11, 1951, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been collected at 800 meters altitude, in anthesis in October and November. Thus far only 2 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 2560 (N--type), 3374 (Z).

VERBENA CAROLINA L., Syst. Nat., ed. 10, 2: 852. 1759.

Synonymy: Verbena caroliniana, fol. integro serrato scabro Ray, Hist. Plant. 3: Suppl. App. 249. 1704. Verbena carolinensis, melissae folio aspero Dill., Hort. Eltham. 407, pl. 301, fig. 388. 1732. Verbena caroliniana Murr. in L., Syst. Veg., ed. 13, 62. 1774 [not V. caroliniana Hort., 1847, nor L. ex Raf., 1825, nor Medic., 1840, nor Michx., 1803, nor (Walt.) Michx., 1960]. Verbena tetrandra, spicis filiformibus, fol. indivisis lanceolatis serratis obtusiusculis subsessilibus Dill. apud Murr. in L., Syst. Veg., ed. 13, 62, in syn. 1774. Verbena caroliniana Willd., Sp. Pl., 1: 119. 1797; Eaton & Wright, N. Am. Bot., ed. 8, 470. 1840. Verbena caroliniana, folio integro, serrato, scabro Ray apud Poir. in Lam., Encycl. Méth. Bot. 5: 548, in syn. 1808. Verbena tetrandra, spicis filiformibus; foliis indivisis, lanceolatis, serratis, obtusiusculis, subsessilibus L. apud Poir. in Lam., Encycl. Méth. Bot. 8: 548, in syn. 1808. Veronica caroliniensis, melissae folio aspero Dill. apud Poir. in Lam., Encycl. Méth. Bot. 8: 548, in syn. 1808. Verbena polystachya H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 274. 1818 [not V. polystachya Jepson, 1947]. Verbena biserrata H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 275. 1818. Verbena veronicaefolia H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 275. 1818 [not V. veronicaefolia J. Sm., 1845]. Verbena veronicaefolia Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825. Verbena caroliniana L. apud Hook. & Arn., Bot. Beech. Voy. 153. 1833. Verbena tetrandra, spicis filif., fol. indivisis lanceol. serratis obtusiusc. subsessilib. L. apud H. E. Richter, Cod. Bot. Linn. 35. 1835. Verbena carolinensis, melissae fol. aspero Dill. apud H. E. Richter, Cod. Bot. Linn. 35, in syn. 1835. Verbena caroliniana, fol. integro serr. scabro

Ray apud H. E. Richter, Cod. Bot. Linn. 35, in syn. 1835. Verbena carolinensis, meliss. fol. asp. Dill. apud Peterm., Cod. Bot. Linn. Ind. Alph. 196, in syn. 1840. Verbena caroliniana, fol. integro etc. Ray apud Peterm., Cod. Bot. Linn. Ind. Alph. 196, in syn. 1840. Verbena mollis Mart. & Gal., Bull. Acad. Brux. 11 (2): 323. 1844 [not V. mollis Raf., 1832]. Verbena paucifolia Mart. & Gal., Bull. Acad. Brux. 11 (2): 324. 1844. Verbena veronicaefolia Humb. & Kunth apud Benth., Bot. Voy. Sulphur 152. 1846. Verbena caroliniana Spreng. apud Schau. in A. DC., Prodr. 11: 546, in syn. 1847. Verbena carolinensis etc. Dill. apud Schau. in A. DC., Prodr. 11: 546, in syn. 1847. Verbena biserrata Kunth apud Schau. in A. DC., Prodr. 11: 546, in syn. 1847. Verbena polystachya Kunth apud Schau. in A. DC., Prodr. 11: 546, in syn. 1847. Verbena veronicaefolia Kunth apud Schau. in A. DC., Prodr. 11: 546, in syn. 1847. Verbena pauciflora Walp., Repert. 6: 687. 1847. Verbena paucifolia Turcz., Bull. Soc. Nat. Mosc. 36 (2): 196. 1863. Verbena caroliniana f. polystachya Loes. in Fedde, Repert 9: 362. 1911. Verbena caroliniana var. polystachya Loes. in Fedde, Repert. 9: 362. 1911. Verbena pauciflora Mart. & Gal. ex Moldenke, Prelim. Alph. List Invalid Names 47, in syn. 1940. Verbena carolinensis Dill. ex Moldenke, Suppl. List Invalid Names 8, in syn. 1941 [not V. carolinensis Gmel., 1959, nor Small, 1933, nor Walt., 1959, nor (Walt.) J. F. Gmel., 1903, nor (Walt.) Small, 1942]. Verbena caroliniana f. polystachya (Kunth) Loes. ex Moldenke, Alph. List Invalid Names 46, in syn. 1942. Verbena caroliniana var. polystachya (Kunth) Loes. ex Moldenke, Alph. List Invalid Names 46, in syn. 1942. Verbena carolinea L. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960. Verbena caroliniana, folio integro serrato scabro Ray apud Moldenke, Résumé Suppl. 2: 11, in syn. 1960.

Bibliography: Ray, Hist. Plant. 3: Suppl. App. 249. 1704; Dill., Hort. Eltham. 407, pl. 301, fig. 388. 1732; L., Syst. Nat., ed. 10, 2: 852. 1759; L., Sp. Pl., ed. 2, 29. 1762; Mill., Gard. Dict., ed. 8, no. 7. 1768; Murr. in L., Syst. Veg., ed. 13, 62. 1774; Dill., Hort. Eltham. Add. Denom. Linn. pl. 301, fig. 388. 1774; Christm. & Panzer, Vollst. Pflanzensyst. Houttuyn 5: 127. 1779; Houttuyn, Linn. Pflanzensyst. 5: 127. 1779; Willd., Sp. Pl. 1: 119. 1797; C. Murr., Brit. Gard. 2: 479. 1799; Poir. in Lam., Encycl. Méth. Bot. 8: 548--549. 1808; Mirbel, Ann. Mus. Hist. Nat. Paris 15: 260, pl. 14 (2), fig. 5. 1810; J. Sm. in Rees, Cycl. 36: nos. 15 & 28. 1817; H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 274--275 & 277. 1818; Steud., Nom. Bot., ed. 1, 873 & 874. 1821; Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825; Cham. & Schlecht., Linnaea 5: 98. 1830; Sweet, Hort. Brit., ed. 2, 418. 1830; Hook. & Arn., Bot. Beech. Voy. 156. 1833; H. E. Richter, Cod. Bot. Linn. 35. 1835; Hook. & Arn., Bot. Beech. Voy. 305. 1838; Eaton & Wright, N. Am. Bot., ed. 8, 470. 1840; Peterm., Cod.

Bot. Linn. Ind. Alph. 196. 1840; Hook. & Arn., Bot. Beech. Voy. 484. 1841; Mart. & Gal., Bull. Acad. Brux. 11 (2): 324. 1844; Walp., Repert. 4: 18, 20, & 21. 1845; Benth., Bot. Voy. Sulphur 152. 1846; Walp., Repert. 6: 686--687. 1847; Schau. in A. DC., Prodr. 11: 546--547. 1847; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 196. 1863; Pickering, Chronol. Hist. Pl. 962 & 1220. 1879; S. Wats., Proc. Am. Acad. Sci. 18: 135. 1883; Briq. in Engl & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1894; Hook. f. & Jacks., Ind. Kew. 2: 1178--1180. 1895; Loes. in Fedde, Repert. Spec. Nov. 9: 362. 1911; Stapf, Ind. Lond. 6: 429. 1931; Perry, Ann. Mo. Bot. Gard. 20: 243, 245--247, 259, 268--272, 275, 342, & 355. 1933; E. D. Merr., Journ. Arnold Arb. 19: 363. 1938; Moldenke, Prelim. Alph. List Invalid Names 44, 45, 47, & 49. 1940; Calderón & Standl, Fl. Salvad., ed. 2, 239. 1941; Moldenke, Suppl. List Invalid Names 8. 1941; Moldenke, Alph. List Invalid Names 45--49 & 51. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 24. 1942; Howard S. Gentry, Rio Mayo Pl. [Carnegie Inst. Wash. Publ. 527:] 222. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 11, 14, 18, 20--22, & 101. 1942; Ramírez Cantú, Anal. Inst. Biol. Mex. 14: 406. 1943; Moldenke, Phytologia 2: 87 & 114. 1945; W. C. Leavenworth, Am. Midl. Nat. 36: 148 & 187. 1946; Moldenke, Alph. List Cit. 1: 28, 35, 46, 53, 89, 144, 203, 218, 232, & 233. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; Moldenke, Phytologia 2: 329, 331, & 347. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Alph. List Cit. 2: 357, 360, 393, 394, 403, 472, 475, 477, 478, 498, 528, 536, 539--542, 588, 595--597, 602, 604, 607, 616, & 639 (1948), 3: 663, 679, 683, 685, 697, 714, 715, 753, 759, 765--767, 772, 779, 780, 787, 829--831, 872, 883, 912, 933, 940, 959, & 961--963 (1949), and 4: 996, 1012, 1013, 1074--1076, 1095, 1111, 1152, 1153, 1166, 1170--1172, 1174, 1182, 1207, 1208, 1211, 1224, 1231, 1233, 1235, 1236, 1241, 1244, 1245, 1254, 1255, 1290, 1291, 1294, 1295, 1298, & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 19, 26, 32, 36--38, 164, & 197. 1949; Ramírez Cantú, Anal. Inst. Biol. Mex. 20: 223. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Rioja & Herrera, Anal. Inst. Biol. Mex. 22: 584. 1951; Moldenke, Inform. Mold. Set 46 Spec. 4. 1951; Moldenke, Sp. Subsp. Cont. Mold. Set 45 [3]. 1951; Bravo & Ramírez, Anal. Inst. Biol. Mex. 22: 421. 1951; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2210. 1951; Rzedowski, Anal. Esc. Nac. Cienc. Biol. 8: 112. 1954; Moldenke, Inform. Mold. Set 48 Spec. [4] (1954), 49 Spec. 3 (1954), and 51 Spec. 4. 1956; Rzedowski, Bol. Soc. Bot. Mex. 21: 32. 1957; Moldenke, Am. Midl. Nat. 59: 347 & 354. 1958; Moldenke, Résumé 24, 31, 39, 42, 44, 45, 223, 358, 361, 366, 370--372, 378, & 471. 1959; Moldenke, Résumé Suppl. 2: 8 & 10--13. 1960; Lewis & Oliver, Am. Journ. Bot. 48: 639--641. 1961; Moldenke, Résumé Suppl. 3: 37, 41, & 42 (1962), 4: 14, 19, & 20 (1962), and 5: 6. 1962.

Illustrations: Dill., Hort. Eltham. pl. 301, fig. 388. 1732; Dill., Hort. Eltham. Add. Denom. Linn. pl. 301, fig. 388. 1774; Mirbel, Ann. Mus. Hist. Nat. Paris 15: pl. 14 (2), fig. 5. 1810; Lewis & Oliver, Am. Journ. Bot. 48: 640. 1961.

Coarse, erect, aromatic herb, mostly annual or biennial, sometimes perennial, slender, 30 cm. to 1.55 m. tall, usually of stiff upright habit, branching to 75 cm.; stems erect or ascending, usually solitary, sometimes 3--5 arising from the crown of a thick rootstock, tetragonal, sulcate, branched, varying from pubescent to more or less villous-hirsute or hirsute-hispid; principal internodes 10--13 cm. long, sometimes 3 times as long as the leaves; leaves numerous but often remote, grayish, varying from short-petiolate to subsessile or sessile; leaf-blades varying from lanceolate or lanceolate-oblong to obovate-lanceolate or somewhat elliptic, 2.5--12 (usually 3--8) cm. long, 0.8--2 cm. wide, acute or obtusish at the apex, cuneately narrowed to the base, coarsely and irregularly serrate or biserrate to crenate-serrate along the margins, lineate-subrugose, varying from appressed-pilose or appressed-pubescent to strigose and somewhat pustulate above, mostly hirsute-strigose (especially along the midrib and larger veins) beneath, sometimes softly sericeous-villous or subglabrescent beneath, sometimes slightly scabridous above; inflorescence paniculate; spikes slender or filiform, elongate, 5--22.5 cm. long, virgate, hirtous-scabrous, terminal or axillary, loosely flowered, subternate or often densely corymbose-aggregate or subfasciculate-congested, open in the fruiting condition; bractlets ovate or ovate-subulate, varying in length, usually about half as long as the calyx or shorter, somewhat spreading, acuminate-subulate at the apex, ciliate-margined; flowers very small or exiguous; calyx 1.3--2 mm. long, the teeth very short, ovate, subequal, mucronate; corolla varying from purplish-white, light-purple, lavender, light-lavender, pale- or very pale lavender to blue, pale-blue, light- or very light-blue, or even violet, mauve, or red, sometimes white tinged with blue, its tube about equaling the calyx or slightly exserted, the limb inconspicuous, about 2 mm. wide; fruiting-calyx about 2 mm. long, hispidulous, the lobes obtuse, mucronate, connivent, enclosing the mature schizocarp; cocci trigonous, dark-brown, barely 1.5 mm. long, the dorsal surface convex, faintly striate and obsoletely reticulate, the commissural faces meeting at right angles, almost smooth; chromosome number: n = 7, 2n = 14.

The species is a very variable one and has been much confused by authors and herbarium workers. Names have been given to various forms which are not sufficiently constant to merit nomenclatural recognition. The type of V. biserrata was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland near the city of Mexico, Federal District, Mexico, and is deposited in the herbarium of the Muséum National d'Histoure Naturelle at Paris. The type of V. veronicaefolia was collected by the same distinguished explorers at Moran, Hidalgo, and that of V. polystachya on the slope of the volcano Xorullo, Michoacán, and are also deposited in the Paris herbarium. The type of V. mollis was gathered by Henri Guillaume Galeotti (no. 737) in three places: (1) in wet places in the Cerro de San Felipe, Guanajuato, (2) near Oaxaca, and (3) in the mountains of Yavezia and Castrasana, at 7500

to 8000 feet altitude, described as having red flowers from May to September. Martens & Galeotti say of it "Affinis Verbenae hirsutae. Nobis."

The type of V. paucifolia is Galeotti 773 bis from the savannas at the German colony of Mirador, Vera Cruz, at 3000 feet altitude, and is said to have bluish flowers in August. The authors of the name say "Affinis Verbenae polystachiae HBK, sed foliis sessilibus, caule minus folioso praesertim diversa."

Specimens of V. carolina have been abundantly misidentified and distributed under the names of V. barbata Steud., V. ciliata Benth., V. ehrenbergiana Schau., V. elegans Humb., V. gentryi Moldenke, V. halei Small, V. hastata L., V. littoralis H.B.K., V. menthaefolia Benth., "V. paniculatae affine", V. recta H.B.K., V. scabra Vahl, V. urticaefolia L., V. urticifolia L., Stylodon carneus (Medic.) Moldenke, and even Ipomoea sp.

On the other hand, the P. C. Standley 21331, Steyermark 49894, Tucker 1307, and S. S. White 3715, distributed as typical V. carolina, are V. carolina f. albiflora Moldenke; G. L. Fisher 3762 and Liebmann 11335 are V. ehrenbergiana Schau.; Rose, Pachano, & Rose 22851 & 22939 and Rose & Rose 22730 are V. glabrata H.B.K.; M. Bang 1058 is V. gracilescens (Cham.) Herter; T. S. Brandegee s.n. [Julian, June 18, 1894] and Doten 241 are V. lasiostachys var. septentrionalis Moldenke; Arsène s.n. [11/11/1909], Calderón 925, and F. W. Pennell 14770 are V. litoralis H.B.K.; H. H. Rusby 6121 & s.n. [Clarke's Valley, Aug. 1, 1883] are V. macdougalii Heller; Conzatti 4207, Pringle 9529, H. E. Seaton 7, and S. S. White 4104 are V. menthaefolia Benth.; E. W. Nelson 1105, Peñalosa 795, and F. Salazar s.n. [Real del Monte, July 12, 1913] are V. recta H.B.K.; J. W. Blankinship s.n. [Berkeley, July 22, 1891] is V. robusta Greene; N. L. Britton 1527, Britton, Britton, & Shafer 292, Britton & Hollick 2704, Britton & Wilson 5771, Brown & Britton 373, W. Harris 9937, León 685 & 1343, and Edw. Palmer 1040 are V. scabra Vahl; and W. C. Coker s.n. [July 8, 1909] is V. urticifolia var. leiocarpa Perry & Fernald, while the Herb. Hort. Bot. Genev. s.n. [18 Aug. 1826] is in part V. recta and in part V. urticifolia var. leiocarpa. The Seler & Seler 4347 distributed as "Verbena spec. aff. V. caroliniana L." and 4194 as "V. caroliniana L. form. vel var. polystachya (Kunth) Loes." are V. longifolia Mart. & Gal. The G. L. Fisher 320 and Pringle 4769 distributed as "Verbena aff. V. polystachya H.B.K." are V. recta HBK.

Concerning the closely related V. ehrenbergiana Schauer says: "Species per se quidem satis insignis, sed quoad habitum fere V. carolinianae hirsutioris formam Schizophyllam exhibens." Perry distinguishes the closely related species of this affinity by means of the following key:

1. Spikes very slender, elongated and graceful, usually with remote fruits.
2. Leaves 1- or 2-pinnatifid, 3--5-cleft, or deeply incised.
3. Corolla-limb not less than 3 mm. broad; cocci 1.5 mm. or more in length.
4. Schizocarp a little longer than broad.
5. Inflorescence usually densely glandular and somewhat viscid-pubescent.....V. officinalis.

5a. Inflorescence sparsely, if at all, glandular and strigillose.....V. menthaefolia.

4a. Schizocarp about twice as long as broad.
6. Leaf-blades diverse in outline, the basal ones incised-dentate, the middle ones 1- or 2-pinnatifid, the upper ones sparingly toothed or entire; bractlets half as long as the calyx during anthesis.V. halei.

6a. Leaf-blades all similar in outline; bractlets about as long as the calyx during anthesis....V. riparia.

3a. Corolla-limb scarcely more than 1 mm. broad; cocci 1.5 mm. or less in length.....V. ehrenbergiana.

2a. Leaves serrate or shallowly incised.
7. Leaves subsessile or short-petiolate with an attenuate base.
8. Stems hirsute-hispid; leaves mostly crenate-serrate; calyx hispidulous.....V. carolina.

8a. Stems glabrous; leaves acutely serrate; calyx practically glabrous.....V. longifolia.

7a. Leaves obviously petiolate, with rounded-cuneate base.
9. Fruiting-calyx spreading; calyx-lobes connivent; stigmatic surface subtended by 2 sterile style-lobes.....V. scabra.

9a. Fruiting-calyx ascending; calyx-lobes not connivent; stigmatic surface subtended by a single sterile style-lobe.....V. urticifolia.

1a. Spikes thicker or densely flowered, usually with contiguous fruits.
10. Spikes subsessile or very short-pedunculate, forming a congested inflorescence, not strict; corolla-limb 2 mm. broad.....V. recta.

10a. Spikes pedunculate, usually not congested, strict; corolla-limb 3--4.5 mm. broad.....V. hastata.

Schauer (1847) reduces V. recta to synonymy under V. carolina, and he is followed in this by Hooker & Jackson (1895), but the two species are amply distinct, as has been pointed out by Perry in her excellent monograph.

It is perhaps worthy of note here that V. caroliana L. is V. curtisii Moldenke; V. carolineana Hort. is V. officinalis L; V. carolina var. glabra Hultén is V. longifolia Mart. & Gal.; V. caroliniana f. recta and var. recta (Kunth) Loes. are V. recta

H.B.K.; V. veronicaefolia J. Sm. is V. peruviana (L.) Britton; V. polystachya Jepson is V. scabra Vahl; V. mollis Raf. is V. stricta Vent.; and V. carolinense (Walt.) Gmel., V. carolinianum L., V. caroliniensis (Walt.) J. F. Gmel., V. carolinensis Gmel., Small, Walt., (Walt.) J. F. Gmel., and (Walt.) Small, and V. caroliniana Hort., L. ex Raf., Medic., Michx., and (Walt.) Michx. are all Stylodon carneus (Medic.) Moldenke. The Verbena caroliniana, erecta, foliis oblongo-obovalibus, obtusis; spicis filiformibus, longissimis, distinctifloris Michx. cited by Poiret in Lam., Encycl. Méth. Bot. 8: 548, in syn. (1808) as a synonym of V. carolina, actually belongs in the synonymy of Stylodon carneus.

The bibliographic citation for the Dillenius synonym given in the above synonymy is sometimes given as page "406", apparently in error.

The hybrid of V. carolina L. with V. hastata L. is known as xV. matritensis, which see.

V. carolina inhabits rich or volcanic soil, brown volcanic acidic soil, moist sand, and moist brownish sandy-loam, rich clayish loam along lake shores, among granitic rocks, in clay or red to black loam, on mountainsides, in open woods and woodlands, weedy fields, open or xeric scrublands, lava fields, pine or open pine and oak forests, open fields, sand bars, canyons and barrancas, arroyo slopes and mountainsides, fields and alpine meadows, grasslands and oak-grasslands, open meadows in pine forests or pine forests with occasional clearings, riverbanks, and humid mountain valleys. It has been collected along densely wooded waterways and slow-running streams at the edge of marshes, in mud near streams, in scrubland on hillsides or on hillsides with pines and oaks, at the edges of cultivated fields, and along roadsides at the edge of cultivation, at altitudes of 85 to 3500 meters. It has been found in anthesis in every month of the year, and in fruit from April to February. It probably also fruits throughout the year. Peñalosa describes it as a "weed between cobblestones".

Blumer found it "in springy soil along creek underlain by andesitic table rock" in Arizona. In Michoacán it is said by Leavenworth to be "common on trails and in streets and fallow fields", and he and Hoogstraal report it as "very common in yards". Mac Daniels says that it is "occasional along borders" in the Federal District, while Stanford, Retherford, & Northcraft found it "in broad damp river bed among varied vegetation or larger shrubs, small trees, and herbs" in Tamaulipas. In Guatemala it is said by Standley to be "a weed in vacant lots" and "common on open weedy hillsides". He and Calderón (1941) report it as "common" in El Salvador, while Yuncker, Dawson, & Youse describe it as "a weedy plant in waste places" in Honduras. Mueller & Mueller assert that it is "very abundant on waste ground" in Nuevo León. It is said to be a "street weed" in Honduras and "common in waste places" in Mexico. Feddema describes it as abundant in gravelly soil in open

sun of wooded slopes and barrancas and abundant in sandy loam along roadsides in open sun on precipitous mountain slopes; Muller says that it is "abundant throughout open pine forests, with flowers white to light-blue"; McVaugh & Koelz found it "weedy along forest road on steep slopes in mesophytic forest near summits of barrancas in the pine zone"; Wilbur & Wilbur aver that it is "very common in bunchgrass meadow in mountains"; Leavenworth & Hoogstraal discovered it to be "very common in yard behind house"; and Fearing & Thompson found it in black soil of volcanic origin in dense pine forests.

The specific name is sometimes written with a capital initial letter. T. H. Kearney, on the label of Harrison, Kearney, & Hastings 6144, says "the distinction between this species and V. urticaefolia seems slight." The tallest specimen yet recorded is Hartman 94, said by the collector to have been 4--5 feet tall.

The species has been in cultivation apparently since 1732. Common and vernacular names recorded for it are "Carolina vervain", "kasará šijókame" (which means "green-herb" in the Tarahumar language), "Mexican vervain", "owáame", "San Juan Axitzi", "verveine de Caroline", and "verbena" -- the last-mentioned name, of course, is also applied to the genus as a whole and to many other species in this and related genera (see under V. bonariensis). Galled fruits may be seen on Hinton 2729 in the Britton Herbarium. Schultes & Reko 237 is a mixture with V. litoralis H.B.K.

Perry (1933) cited Willd., Sp. Pl. 1: 119 as published in "1798", rather than 1797. Howard S. Gentry 598m was collected on the Sonora-Chihuahua boundary, according to its labels, and could be from either state. Kearney & Peebles 10506 and Pringle s.n. [15 July 1881] were collected in the Santa Rita Mountains, and so may actually be either from Pima or Santa Cruz Counties, Arizona. J. Gonzalez Ortega 302, from "Concordia, Panuco, Santa Lucia", and 667, from "Choix", could be either from Nayarit or Sinaloa. Barkley, Paxson, & Webster 2655 in the herbarium of the University of Texas is a mixture with something non-verbenaceous. Watson (1883) says of Edw. Palmer 2037 "perhaps a hybrid between V. polystachya or V. urticaefolia and V. xutha."

Hinton reports that a triturate of this species is taken in the treatment of malaria in Mexico, while Pennington says that the leaves are mashed and placed on boils and contusions to combat infection; "In winter the root is dug up and used in same fashion; flowers may be made into a tea and drunk for boils or washed on wounds....boil all plant; wash swollen places with decoction several times a day."

Schauer (1847) cites Ehrenberg 516 & 846, Alaman s.n., Berlandier 252, 265, 749, & 1222, Schiede 134, and Herb. Willdenow 1112, all from Mexico, deposited in the Berlin, De Candolle, Kunth, and Willedow herbaria. He says of V. veronicaefolia, which he reduces to synonymy under V. carolina: "forma aprica, sitiens,

magis hirsuta; spicis rarioribus brevioribusque." He says that V. carolina is closely related to V. urticifolia, but distinct in its leaf characters, ternate spikes, and flowers. "Tota planta statura, indumento et inflorescentiae conditione valde variat; habitu autem, foliorum figura, flore et fructu tuto recognoscenda."

Gentry (1942) cites his no. 598 as V. menthaefolia Benth. Ramírez Cantú (1943) reports V. carolina from Alchichica, Matamoras (Tamaulipas), and Ayutla, Mexico. Perry (1933) cites the following 52 additional specimens and 3 photographs not as yet seen by me: NEVADA: Douglas Co.: Lemmon 3075 (G). ARIZONA: Cochise Co.: Blumer 1783 (E, G); M. E. Jones 25006 (G), s.n. [Huachuca Mts., Sept. 4, 1903] (W). Santa Cruz Co.: Pringle s.n. [Santa Rita Mts., 15 July 1881] (G). MEXICO: Chihuahua: Edw. Palmer 364 (D, G). Colima: Edw. Palmer 1156 (G). Durango: Edw. Palmer 339 (E, F, G). Federal District: Bourgeau 119 (G); Humboldt & Bonpland s.n. [near city of Mexico] (E--photo); Orcutt 3488 (F); Pringle 9312 (E, F, G). Guanajuato: Duges s.n. [Guanajuato, 1880] (G). Hidalgo: Clokey 1865 (E); Humboldt & Bonpland s.n. [near Moran] (E--photo). México: Pringle 2813 (F, G). Michoacán: Humboldt & Bonpland s.n. [Xorullo] (E--photo). Morelos: G. L. Fisher s.n. [Toro, 5 Aug. 1924] (E, F); Pringle 9529, in part (E, G). Nayarit: Gregg 1001 (E), Oaxaca: Galeotti 737, in part [near Oaxaca] (K), 795a (G); Pringle 4892 (D, E, G); C. L. Smith 224 (E), 634 (G). Puebla: Orcutt 4045 (F). Sonora: Hartman 94 (G); Lloyd 448 (G). Vera Cruz: Botteri 180 (E, F, G); C. L. Smith 1737 (G). State undetermined: Graham s.n. (G). GUATEMALA: Alta Verapaz: Türckheim 8442 (F, G), II.651 (E, F). Comayagua: P. C. Standley 55944 (F). El Quiché: Heyde & Lux 3018 (D, E). Izabal: P. C. Standley 24443 (E). EL SALVADOR: La Libertad: P. C. Standley 23083 (G). San Salvador: Calderón 794 (G); P. C. Standley 22414 (G). The Galeotti 735 (K) and P. C. Standley 21331 (E, G) which she cites are actually f. albiflora Moldenke, while the Heyde & Lux 3019 which she cites is a mixture with V. litoralis H.B.K. and Pringle 9529 is a mixture with V. menthaefolia Benth. She states that "This species is probably most nearly related to V. urticifolia and V. scabra, but is easily set apart from them by its subsessile or very short-petiolate leaves; moreover their areas of distribution are practically distinct. The collections cited appear to be conspecific, notwithstanding the fact that they vary greatly in size, serration of leaves, and length of floral bracts. The specimens from the northern part of the range are slightly coarser, with leaves more remotely crenate-serrate, yet they match very closely Pringle 4892, from the Sierra de San Felipe, Oaxaca. In the latter, however, the leaves are more densely pubescent on the under surface. The specimens from Gua-

temala and Salvador have somewhat crowded spikes and are, as a whole, smaller in every way and more densely hispidulous. However, since most of the collections were made from December to February, it seems as if this more compact habit might be a seasonal rather than a geographic variation.

"A specimen labelled 'Inter Tallahassee et St. Marks, Florida, legit Rugel, April-June 1843' appears in the herbarium of the Missouri Botanical Garden. As this is the only representative of V. carolina seen from Florida, and as it is so far from the natural range of the species, it would appear to be an error in labelling. Another collection worthy of mention is Nelson 752. It is almost glabrous, and the lobes of the corolla are emarginate, a rather unusual feature in this series. The lack of pubescence suggests V. longifolia, but unfortunately none of the available material of the species is in sufficiently good condition to reveal the character of the corolla. Although the general habit of the collection is that of V. carolina, it is rather doubtfully conspecific."

In all, 434 herbarium specimens, including the type collections of many of the names involved, and 13 mounted photographs have been examined by me.

Citations: ARIZONA: Cochise Co.: Blumer 1783 (Du--9541, Ka--60404, N, Se--92552, W--561942), U.213 (Tu); Fish 2 (Tu--32400); Harrison & Kearney 6144 (W--1439102); Harrison, Kearney, & Hastings 6144 (To); M. E. Jones 25006 (N, Po--192929), 25016 (Gg--172998), s.n. [Huachuca Mts., Sept. 4, 1903] (Du--151780, Po--71007, W--856990); Kearney & Peebles 13847a (To); A. R. Moldenke 137 (Am, Fg, Z, Z); Shreve 5047 (Fs), 6353 (Cm, Fs); J. J. Thornber 7045 (Tu); T. E. Wilcox s.n. [Fort Huachuca, July 1893] (C). Gila Co.: J. J. Thornber s.n. [Natanes Plateau, June 29, 1905] (Tu). Pima Co.: J. J. Thornber s.n. [Fort Lowell, August 28, 1904] (Tu). Santa Cruz Co.: Kearney & Peebles 10506 (Po--2086l7, To, W--1624599); Pringle s.n. [Santa Rita Mts., 15 July 1881] (Vt). County undetermined: Blumer U.R.54 (Tu); C. T. Mohr s.n. [in cultis Arizona] (W--771858). MEXICO: Baja California: T. S. Brandegee s.n. [Sierra San Francisquito, Oct. 16, 1893] (Ca--169170), s.n. [Oct. 1, 1899] (N); K. L. Chambers 899 (Du--384815); M. E. Jones 27365 (Bm, Ca--522135, Du--229831, Mn, Po--191017), 27395 (N). Chiapas: Matuda 2496 (Mh, Mi), 16217 (Mi, N, W--1920488); Nakamura 1934 (Mh, N). Chihuahua: Correll & Gentry 23012 (Ld), 23194 (Ld); Galeotti 790 (Br, F--photo, N--photo, S--photo, Z--photo); M. E. Jones s.n. [San Diego Canyon, Sept. 16, 1903] (Po--71003), s.n. [Guayanopa Canyon, Sept. 23, 1903] (Po--71009); Edw. Palmer 364 (W--56172, W--1323118); Pennington 18 (Ss), 595 (Ss), 702 (Ss). Colima: Edw. Palmer 1156 (Mi, N, W--209010). Durango: Maysilles 7716 (Mi), 7775 (Mi); Edw. Palmer 339 (Ca--104863, N, W--304174); Waterfall 12623a (Ok), 16179 (Ca); Water-

fall & Wallis 13642 (Ok), 13677 (St). Federal District: Barkley, Rowell, & Webster 2199 (Mi, N); Bourgeau 119 (Br, Cb, Cb, S, W--56160); L. I. Davis s.n. [Desert of Lions] (N); Degener & Degener 26183 (N, W), 26237 (N); G. L. Fisher 322 (S), s.n. [July 18, 1924] (Vi); Kenoyer s.n. [Pedrigal, 7-7-38] (Fs, Mi); MacDaniels 71 (Ba), 621 (Ba), 713 (Ba); Matuda 18833 (N), 21191 (N); C. R. Orcutt 3488 (Io--70280, W--574728); Pringle 9312 (B, N, Vt, W--396428); Rose, Painter, & Rose 8496 (N, W--451988); Schiefer 139 (Vi); Schnooberger 8540 (Mi); Villa Ramirez, Barkley, & Webster 2187 (Au); Zamora, Paxson, & Barkley 14M860 (Au). Guanajuato: Galeotti 737, in part [Serra de San Felipe] (Br, F--photo, N--photo, S--photo, Z--photo); Née 88 (Q). Guerrero: L. I. Davis 228 (N); Hinton 9287 (K, N, N, W--1822299); Richards & Rowell 3215 (Cb), 3288 (Cb); Rowell 2080 (Au--122005, N). Hidalgo: F. A. Barkley 17M026 (Au--123200, Au--123228, N); Clokey 1865 (Ca--882791); L. I. Davis 218 (N); M. T. Edwards 757 (Du--275555); G. L. Fisher 46132 (Gg--346483); Lundell & Lundell 12391 (N, Rf, W--1927029); E. Lyonnet 2219 (W--1790965); Moldenke & Moldenke 19844 (N). Jalisco: Bárcena 564 (Me); Bravo Hollis 253-7138 (Me); L. I. Davis s.n. [Guadalajara] (N); Kempton & Collins s.n. [Ciudad Guzman, Oct. 14, 1921] (W--1081731); McVaugh & Koelz 1148 (Mi); Wilbur & Wilbur 1799 (Mi). México: Barkley, Rowell, & Paxson 626 (Au--123258); Beauchamp s.n. [Sacromote Hill, Oct. 27--29, 1926] (La); G. L. Fisher s.n. [Amecameca, July 24, 1924] (Cm, Du--156172, Du--172648); Hernández Xolocotzi 2100 (N), X.331 (N), X.1977 (N); Hinton 822 (N, N), 2729 (N, N, N), 12974 (La); Kempton & Collins s.n. [Chalco region, Oct. 4, 1921] (W--1081713); C. L. Lundell 12209 (W--1927025); Lundell & Lundell 12209 (N, Rf), 12355 (N, Rf); Matuda 21077 (N), 21240 (N), 21414 (N), 26802 (Cb), 27107 (Cb), 27274 (Cb), 28829 (Cb), 28839 (Z), 28947 (Cb), 29992 (Ss); Moldenke & Moldenke 19850 (Es, Lg, N, Sm), 19851 (Es, F, Lg, Mg, Mr, N, N, No, Ot, S, Sm); Ortenburger, Paxson, & Barkley 16M704 (Au), 16M713 (Au, N), 16M717 (Au, N), 16M810 (Au, Ec, M, N, Si); Peñalosa 718 (Gg); Schultes & Reko 237, in part (Oa--8209); Waterfall & Wallis 14052 (Ok). Michoacán: Arsène 2799 (Br), 3000 (W--464296), s.n. [Quinceo pres de Morelia, 11/11/1909] (W--464299); Barkley, Paxson, & Webster 2655, in part (Au--123275, N), 2757 (Au--165929, N); Barkley, Rowell, & Paxson 626 (N); L. I. Davis s.n. [E. of Uruapan] (N), s.n. [Zacapu] (N); G. L. Fisher 45126 [Herb. Wall 5] (Ew, S, S); Hinton 12974 (Mi, N, W--1805646), 13022 (Au, Mi, N, N, W--1891017); W. C. Leavenworth 295 (Ld, N, Tu--35534, Ur); Leavenworth & Hoogstraal 1065 (Mi, N, Ur); R. L. Oliver 168 (Bm), 170 (Bm); G. Ordets s.n. [Agosto 14/

1954] (N, W—2287149); Waterfall 16411 (Ca), Morelos: Barkley, Webster, & Rowell 7364 (Au—123250, N); C. E. Boyd 8 (Cb); J. T. Camp 8 (Cb); Downing 119 (Cb); Fearing & Thompson 131 (Au—183350, Ok); W. Fosberg 88 (Cb); Halbinger & Reko 314 (N); J. T. Harris 14 (Cb); E. Lyonnet 2494 (W—1748339); Moldenke & Moldenke 19837 (B, Es, F, Fy, Hw, Le, Lg, Lm, Mg, Mr, N, N, N, No, Ot, Rs, S, Sm, Ss); F. F. Nye 88 (Cb); Pringle 9529, in part (Me, N, Vt); R. Redfield 4 (W—13172020); W. Trelease 208 (Ur). Nayarit: Feddema 318 (Mi), 669 (Mi); R. S. Ferris 5774 (Du—185337), 5851 (Du—185336); M. E. Jones 23245 (Po—162778); W. H. Lewis 5377 (Nb); R. McVaugh 18865 (Mi); Edw. Palmer 2057 (W—305635). Nuevo León: M. T. Edwards 238 (Du—276788); Meyer & Rogers 2685 (N); C. H. Muller 2865 (Ca—719895, Ca—719896, Mi, Rf); Mueller & Mueller 1134 (Au, Me, Me, Mi); M. E. Taylor 238 (Ca—732111, N). Oaxaca: W. H. Camp 2716 (N); Chico s.n. [Chontal] (N); C. Conzatti 4993 (W—1696340); Conzatti, Rowell, & Barkley 17M410 (Mi, N); Galeotti 737, in part [near Oaxaca] (Br), 795a (Br, N, V, W—572876), 795d (Br); R. M. King 2028 (Mi); E. W. Nelson 752 (W—585736), 1021 (W—565808); Pringle 4892 (Br, C, Ca—104862, Cm, Io—38758, Me, Me, Me, Mi, Mn—15389, S, Vt, W—251681); Schultes & Reko 237 (Me); C. L. Smith 224 (N, W—312716). Puebla: Barkley, Rowell, & Webster 2447 (Au); O. M. Clark 7348 (N); L. I. Davis 224 (N); Nicolas s.n. [22/6/1909] (Br, Br), s.n. [Atoyac, 15/7/1909] (W—464381); A. J. Sharp 441290 (N). Querétaro: Collector undesignated 17 (Q). Sinaloa: Dehesa 1551 (W—1035728); Howard S. Gentry 6452 (N), 6474 (N); J. Gonzalez Ortega 302 (Me), 667 (Me), 7123 (Gg—228455, Me, W—1639050); J. N. Rose 1677 (W—300534). Sonora: Harold Gentry 598 (Du—263641); Howard S. Gentry 598m (Mi, W—1790909); Hartman 94 (Ca—104833, N, W—306108); Mearns 2627 (W—234306); Rose, Standley, & Russell 12450 (W—635257); S. S. White 2989 (Mi), 3309 (Mi). Tamaulipas: Stanford, Retherford, & Northcraft 916 (Du—288672, N). Vera Cruz: Alvarado s.n. [IV. 1906] (W—1490133); Balls 4667 (W—1793687), B.4667 (Ca—685140, N); Botteri 180 (W—56187); Galeotti 773 bis (Br, F—photo, N—photo, Si—photo, Z—photo); Herb. Schlechtendal s.n. [Jalapa] (Br); F. W. Johnson s.n. [Jalapa, 9/18/1906] (N); Liebmann 11339 (W—1315098); Matuda 1277 (Mh); C. T. Mohr s.n. [Orizaba, July 1857] (W—771865); F. Müller 766 (M), 887 (M), s.n. [Orizaba, 1853] (M); R. L. Oliver 157 (Bm); Schiede 88 (M); Schlechtendal 2109 (S); A. J. Sharp 44725 (N), 45576 (N); C. L. Smith 1737 (Ca—975835, N). State undetermined: Berlandier 749 (Du—166465); Galeotti s.n. (Br); S. Kaiser s.n. (By); Liebmann 11341 (W—1315099); Linden 169 (Br); Née 16 (Q), 113 (Q); R. Runyon 1360

[Texcoca] (W—1567928); Runyon & Tharp 884 (Au). GUATEMALA: Alta Verapaz: Türckheim 913 (G, W—1323116), 8442 (C, G, W—1323086), II.651 [Herb. Hort. Thenen. I.6029] (Br, Gg—31282, Mi, W—576590). Amatitlan: Shannon 3638 (W—56184, W—1323084); Tonduz 488 (W—1080090). Chimaltenango: Skutch 500 (Mi, W—1586115). El Quiché: Heyde & Lux 3018 (W—56183, W—480118, W—1323085). Guatemala: Bernoulli 127 (Br, M); Rojas 44 (W—1166607); Tonduz 628 (W—1167380). Huehuetenango: Degener & Degener 26657 (N); P. C. Standley 83005 (N). Izabal: P. C. Standley 24443 (G, W—1150086). Jalapa: P. C. Standley 76608 (N). Santa Rosa: Heyde & Lux 3019, in part (C, G, W—258568, W—1323082). Sololá: Kellerman 5825 (W-861041); Tejada 57 (W—862097), 72 (W—862099). Department undetermined: Heyde 120 (W—246283), 477 (W—246107), 530 (W—246283); Morales Ruano 786 (W—1405241). HONDURAS: Comayagua: P. C. Standley 55944 (W—1409016); Yuncker, Dawson, & Youse 5625 (Dp, Mi, S). Morazán: Glassman 1864 (Ok, Ur); P. C. Standley 26227 (W—2022692). EL SALVADOR: La Libertad: Choussy 36 (W—1165702); P. C. Standley 23083 (S, W—1138783). San Salvador: Calderón 794 (W-1151750); H. Pittier 1909 (W—578311); Renson 175 (N, W—575573); P. C. Standley 22414 (N, W—1138157); L. V. Velasco 8999 (W—1303083). Santa Ana: Tucker 1307 (N). CULTIVATED: Italy: Herb. Harvey s.n. [h. R. P. ex seminib. hort. Gotting.] (Du—166488). Mexico: Arsène 8501 (B, N). Russia: Hort. Bot. Petrop. s.n. (W—56161). Spain: Collector undesignated 65 (Q); Herb. Hort. Reg. Matrit. 14 (Q), 15 (Q), 18 (Q). LOCALITY OF COLLECTION UNDETERMINED: Herb. Fabricius 2 (Bm); Herb. Jacquin 1 (Bm); Herb. Linnaeus S.17, G.35 (N—photo of type); Née 100 (Q).

VERBENA CAROLINA f. ALBIFLORA Moldenke, Phytologia 7: 430. 1961.

Synonymy: Verbena hirsuta Mart. & Gal., Bull. Acad. Brux. 11 (2): 321. 1844.

Bibliography: Mart. & Gal., Bull. Acad. Brux. 11 (2): 321. 1844; Schau. in A. DC., Prodr. 11: 547. 1847; Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Perry, Ann. Mo. Bot. Gard. 20: 268 & 355. 1933; Moldenke, Suppl. List Invalid Names 8. 1941; Moldenke, Alph. List Invalid Names 47. 1942; Moldenke, Résumé 366. 1959; Moldenke, Résumé Suppl. 3: 10, 11, & 38. 1962.

This form differs from the typical form of the species in having white or whitish corollas. It is described as an herb 0.5 m. tall, with dull-purple calyxes.

The type of the form was collected by Stephen S. Wise (no. 3379) in Cañón de El Temblor, Sonora, Mexico, on August 19, 1940, and is deposited in the herbarium of the University of Michigan at Ann Arbor. V. hirsuta was based on Galeotti 735 and 790 from (1) the neighborhood of Jalapa, Vera Cruz, at 3000—4000 feet altitude, and (2) the woods of El Sabino, Chihuahua, near Iamiquil-

pan, at 5000 feet altitude, said to have white flowers, blooming in August, collected in 1840. The authors of the name say "Se trouve dans toute la region temperée des environs de Xalapa..... Affinis Verbenae Carolinianae L.; sed foliis hirsutioribus minus elongatis spicisque densis plurimis distincta." Perry (1933) gives as the type locality "Sierra Templada in general, June--Oct. 1840."

The form has been found in grasslands and oak-grasslands, moist meadows, streets, pin oak forests, pine-oak forests and pine forest areas, humid mountain valleys, on rocks, and in steep moist canyons under mixed dominants in northern exposure, at altitudes of 4000 to 8500 feet, flowering from February to April, July to September, and in November, and fruiting in March, April, July, August, September, and November. It is described by collectors as an annual, herbaceous biennial, or even "small shrub", with 3--5 stems 0.5--1 meter tall (not "3--5 m. tall" as stated in error on one label!). Herbarium material has been identified and distributed as V. carolina L., V. gentryi Moldenke, and V. polystachya H.B.K. Tucker describes it as "common".

Perry (1933) cites, in addition, three specimens not as yet seen by me, but as V. carolina: Galeotti 735 (K) and P. C. Standley 21331 (E, G). In all, 19 herbarium specimens, including the types of both names involved, and 4 mounted photographs have been examined by me.

Citations: MEXICO: Federal District: Matuda 19082 (N). Sinaloa: H. S. Gentry 6212 (Ge, Mi, Tu--125094), 6452 (Du--321413, Mi). Sonora: S. S. White 2647 (Mi), 3379 (Mi--type), 3715 (Mi, W--2132267). Vera Cruz: Galeotti 735 (Br, F--photo, N--photo, Si--photo, Z--photo). GUATEMALA: Chimaltenango: P. C. Standley 57948 (Ca--717643, N). Huehuetenango: J. A. Steyermark 49894 (W--1922860). HONDURAS: Morazán: Williams & Molina R. 11959 (Mi). EL SALVADOR: Santa Ana: Tucker 1307 (Ca--908, Rf, W--2088428). San Vicente: P. C. Standley 21331 (W--1137136).

VERBENA CATHARINAE Moldenke, Phytologia 4: 451, nom. nud. (1953) & 5: 92. 1954.

Bibliography: Moldenke, Phytologia 4: 451 (1953) and 5: 92. 1954; Moldenke, Biol. Absrr. 29: 2934. 1955; G. Taylor, Ind. Kew. Suppl. 12: 149. 1959; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 110 & 471. 1959; Angely, Fl. Paran. 16: 78 (1960) and 19: 46. 1961.

Herb, with decumbent stems, very sparsely hirsute, more densely so on the younger parts; principal internodes 0.6--1.6 cm. long; leaves decussate-opposite, small, about 1 cm. long in all and 7 mm. wide; petioles very slender, 1--4 mm. long, sulcate above, sparsely hirsutulous; leaf-blades gray-green on both surfaces, ovate in outline, 3-lobed, each lobe deeply parted or dissected, sparsely hirsutulous, the ultimate segments acutish at the apex; midrib and secondaries filiform, deeply impressed above; inflorescence terminal, spicate, about 4 cm. long.

NOTES ON BROMELIACEAE, XIX

Lyman B. Smith

MEXICO

TILLANDSIA LEUCOLEPIS L. B. Smith, sp. nov.

A T. calothyrso Mez, cui affinis, inflorescentia laxa, bracteis florigeris ecarinatis, sepalis liberis differt.

Stemless, about 1.5 m. high; leaves many in a spreading rosette, 6-8 dm. long, covered with cinereous appressed scales; sheaths elliptic, 25 cm. long, purple-black; blades recurving, narrowly triangular, attenuate, 7 cm. wide at base, flat; scape ascending; scape-bracts imbricate but with recurving foliaceous blades; inflorescence subtripinnate with the lowest branches divided; primary bracts ovate, red, about equaling or exceeding the bracteate sterile bases of the branches, the lower foliaceous-laminate, the upper attenuate; secondary bracts scarcely larger than the floral bracts; spikes oblong, strongly complanate, to 13 cm. long exclusive of the bracteate sterile base, 3 cm. wide, subdensely 13-flowered; rhachis flexuous, alate, largely exposed; floral bracts imbricate, elliptic, acute, 34 mm. long, ecarinate, covered with white appressed scales; pedicels short; sepals free, lance-oblong, acute, 33 mm. long, glabrous, the posterior carinate; petals linear, 5 cm. long, naked; stamens exserted. Pl. I, fig. 1: Habit x ca. 1/20; fig. 2: Spike x 1/2; fig. 3: Sepal x 1.

Type in the U. S. National Herbarium, collected from cultivated material, State of Oaxaca, Mexico, March 15, 1962, by T. MacDougall (No. 280).

COSTA RICA

VRIESEA AMPLA L. B. Smith, sp. nov.

A V. pittieri Mez, cui valde affinis, foliis late rotundatis vel subacutis subtus albo-lepidotis, rhachi crassiore, bracteis florigeris amplissimis differt.

Stemless; leaves about 12 in a broadly funnelform rosette, 3-6 dm. long, covered with white appressed dark-centered scales; sheaths elliptic-oblong, large but inconspicuous and not much wider than the blades, brownish from the prominent centers of the scales; blades ligulate, broadly rounded or subacute, apiculate, 5-6 cm. wide, flat, becoming glabrous above; scape straight or curved, stout; scape-bracts erect, imbricate, the lower subfoliaceous, the upper broadly ovate, apiculate, obscurely punctate-lepidote, yellow when dry; inflorescence simple, dense, 20-30 cm. long, appearing glabrous; rhachis geniculate, angled, 7-8 mm. thick; floral bracts partially secund with the flowers, broadly ovate, 35-40 mm. long, 40-50 mm. wide, cucullate, ecarinate, coriaceous, even, yellow to castaneous when dry with a narrow paler margin; pedicels stout, 8 mm. long; sepals broadly ovate, obtuse,

cucullate, 30-40 mm. long, ecarinate, coriaceous; petals at least 15 mm. longer than the sepals; stamens included. Pl. I, fig. 4: Apex of leaf x 1/2; fig. 5: Spike x 1/2; fig. 6: Sepal x 1.

Type in the U. S. National Herbarium, collected on ground and trees, 10 miles south of Cartago on Inter-American Highway, Talamanca Mountains, Province of Cartago, Costa Rica, altitude 1830 m., July 10, 1962, by A. Lee Haines and Bruce L. Haines (No. 688)

COSTA RICA: Cartago: On stump, Inter-American Highway 6 miles south of Cartago, Talamanca Mountains, alt. 1650 m., Haines 670 (US); same, 18 miles south of Cartago, alt. 1815 m., Haines 716 (US); on tree, Cerro de La Carpintera, alt. 1500-1850 m., Standley 34364 (US).

VRIESEA HAINESIORUM L. B. Smith, sp. nov.

A V. viride (Mez & Wercklé) Sm. & Pitt., cui aliquid affinis, inflorescentia pauciflora laxissima, axi gracillimo, bracteis florigeris sepalisque majoribus differt.

Stemless, flowering 35 cm. high; leaves many in a broad rosette, 20 cm. long, covered with white appressed dark-centered scales; sheaths elliptic, 7-8 cm. long; blades narrowly triangular, attenuate, 15 mm. wide at base; scape slender, curved; scape-bracts erect, red, their elliptic sheaths shorter than the upper internodes but their foliaceous blades much exceeding them; inflorescence few-flowered, very lax, 7 cm. long; axis slender, geniculate; primary bracts long-attenuate from an ovate base, the lowest nearly equaling the flowers; branches spreading, densely 2-flowered, the sterile base naked, slender, 8 mm. long; floral bracts suborbicular, 16 mm. long, exceeded by the sepals, coriaceous, soon glabrous, yellow, carinate; pedicels stout, 3 mm. long; sepals elliptic, broadly rounded, 20 mm. long; petals 28 mm. long, bearing 2 acute scales at base. Pl. I, fig. 7: Apex of leaf x 1/2; fig. 8: Inflorescence x 1/2; fig. 9: Sepal x 1; fig. 10: Petal x 1.

Type in the U. S. National Herbarium, collected on the Inter-American Highway, 6 miles south of Cartago, Talamanca Mountains, Province of Cartago, Costa Rica, altitude 1650 m., July 10, 1962, by A. Lee Haines and Bruce L. Haines (No. 682).

VRIESEA LEUCOPHYLLA L. B. Smith, sp. nov.

A V. spectabile (Mez & Wercklé) Sm. & Pitt., cui affinis, foliis concoloribus omnino albo-lepidotis, bracteis primariis patentibus attenuatis differt.

Stemless, flowering 36-60 cm. high; leaves many in a broadly funnelform rosette, 30-33 cm. long, covered throughout with white appressed dark-centered scales; sheaths elliptic, 12 cm. long; blades narrowly triangular, 25 mm. wide at base, flat; scape slightly curved; scape-bracts densely imbricate, subfoliaceous, red; inflorescence laxly cylindric, bipinnate, 14-28 cm. long; axis slender, nearly straight, almost black when dry, glabrous; primary bracts spreading, attenuate from a broadly ovate base, to 8 cm. long, red, white-lepidote toward apex; branches densely 2-flowered, the naked sterile base to 8 mm. long, floral

bracts suborbicular, to 14 mm. long, about equaling the sepals, subcoriaceous, yellow when dry, glabrous; flowers subsessile; sepals somewhat asymmetric, broadly obovate, subtruncate, to 14 mm. long. Pl. II, fig. 1: Branch of inflorescence x 1/2; fig. 2: Sepal x 1.

Type in the U. S. National Herbarium, collected on rock outcrop, 11 miles south of Cartago on Inter-American Highway, Talamanca Mountains, Province of Cartago, Costa Rica, alt. 1860 m., July 10, 1962, by A. Lee Haines and Bruce L. Haines (No. 693). Small specimen in young flower.

COSTA RICA: Cartago: On tree, 18 miles south of Cartago on Inter-American Highway, north side of Talamanca Mountains, alt. 1985 m., Haines 763 (US, large specimen in fruit); same, 6 miles south of Cartago, alt. 1650 m., Haines 679 (Hb. Haines, in fruit; US, immature inflorescence).

COLOMBIA

TILLANDSIA CONFINIS var. CAUDATA L. B. Smith, var. nov.

A var. confinis bracteis primariis infimis longe caudato-laminatis, laminis spicas superantibus differt.

Inflorescence 3 dm. long; lower primary bracts to 15 cm. long, their caudate-attenuate blades much exceeding the axillary spikes but their sheaths much shorter.

Type in the U. S. National Herbarium, collected on Sabana Rubia, Manaure road, Municipio of Robles, Serrania de Perijá, Department of Magdalena, Colombia, altitude 2800 m., March 3, 1959, by R. Romero-Castañeda (No. 7323).

TILLANDSIA ROMEROI L. B. Smith, sp. nov.

A T. lajensi André atque T. arcuata L. B. Smith, quibus affinis, spicis multo longioribus, bracteis florigeris apice breviter carnoseque carinatis, sepalis vix carinatis differt.

Stemless, flowering 1 m. high; leaves 5 dm. long, covered beneath with pale appressed dark-centered scales; sheaths elliptic, ca. 15 cm. long; blades narrowly triangular, 5 cm. wide at base, becoming glabrous above; scape erect; scape-bracts strict, densely imbricate, subfoliaceous, the upper red; inflorescence typically compound from 4 spikes, lax; axis stout, geniculate, short; primary bracts broadly ovate, apiculate, scarcely larger than the floral bracts; spikes erect to spreading, linear, strongly complanate, 14-30 cm. long with the terminal largest, 3-4 cm. wide, densely many-flowered, the sterile base short, 1-bracteate; floral bracts suborbicular, apiculate, to 45 mm. long, about equaling the sepals, thin-coriaceous, nearly even, glabrous, red, bearing a short fleshy keel at apex; flowers short-pedicellate; sepals lance-oblong, subacute, 35 mm. long, mostly ecarinate, sparsely brown-lepidote; petal-blades elliptic, 8 mm. long, violet; stamens included. Pl. II, fig. 3: Apex of leaf x 1/2; fig. 4: Spike x 1/2; fig. 5: Sepal x 1.

Type in the U. S. National Herbarium, collected on tree, Sabana Rubia, Manaure road, Municipio of Robles, Serranía de Perijá,

Department of Magdalena, Colombia, altitude 2800 m., March 3, 1959, by R. Romero-Castañeda (No. 7307).

VRIESEA MAGDALENAE L. B. Smith, sp. nov.

A V. hospitali (L. B. Smith) L. B. Smith, cui affinis, bracteis florigeris acuminatis sepala superantibus carinatis coriaceis differt.

Stemless, flowering over 1 m. high; leaves 4-6 dm. long; finely and regularly red-striped, obscurely punctate-lepidote; sheaths elliptic, ca. 15 cm. long, brownish; blades ligulate, broadly subacute and apiculate, 5 cm. wide; scape erect, 1 cm. in diameter, red; scape-bracts erect, the upper about equaling the internodes, broadly ovate, apiculate, red; inflorescence slenderly thyrsoid, 35 cm. long, 6 cm. wide, dense toward apex, interrupted below, nearly glabrous; axis straight, slender; primary bracts very broadly ovate, apiculate, about half as long as the branches and equaling the lower spikes, punctate toward apex; branches divergent, mostly of 3 subfasciculate spikes with the 2 basal much smaller than the terminal; spikes broadly ovate, strongly complanate, 2-3 cm. long, subdensely few-flowered; rhachis geniculate, angled, almost wholly exposed; floral bracts ovate, acuminate, to 20 mm. long, exceeding the sepals, sharply carinate, coriaceous, nerved, green; flowers subsessile; sepals free, elliptic, acute, 13 mm. long, coriaceous, nerved, the posterior carinate; petals 4 mm. longer than the sepals, pale yellow, bearing 2 scales at base; stamens included. Pl. II, fig. 6: Apex of leaf x 1/2; fig. 7: Branch of inflorescence x 1/2; fig. 8: Sepal x 1.

Type in the U. S. National Herbarium, collected on tree, vicinity of Cebolleta, Department of Magdalena, Colombia, altitude 2400 m., February 1, 1959, by R. Romero-Castañeda (No. 7199).

PERU

FOSTERELLA L. B. Smith

Schidospermum Griseb. in Lechler, Berberid. Amer. Austr. 56. 1857. Nomen.
Fosterella L. B. Smith, Phytologia 7:171. 1960.

In filing a series of type photographs of Liliaceae, I was struck by the familiar appearance of the monotypic Schidospermum Griseb., supposedly a synonym of Chlorophytum. The specimen is obviously a Fosterella in the Bromeliaceae and fortunately has no description (thanks to information from Dr. Bernice G. Schubert), so that it will not be necessary to make new combinations for the whole genus. The species was described later from the same collection by Baker as Chlorophytum schidospermum and this specific name must be considered as follows:

FOSTERELLA SCHIDOSPERMA (Baker) L. B. Smith, comb. nov.
Schidospermum sanseviera Griseb. in Lechler, Berberid. Amer.

Austr. 56. 1857. Nomen.
Chlorophytum schidospermum Baker, Journ. Linn. Soc. Bot. 15:326. 1876.
Cottendorfia rusbyi Baker, Bull. Torrey Bot. Club 29:697. 1902. Not Lindmania rusbyi Mez, 1901.
Lindmania weberbaueri Mez, Fedde Rep. Spec. Nov. 12:417. 1913.
Fosterella weberbaueri (Mez) L. B. Smith, Phytologia 7:172. 1960.

PERU: Junín: Chanchamayo Valley, alt. 1500 m., Schunke 273 (F). La Merced, alt. 700 m., Macbride 5352 (F, GH). Río Paucartambo Valley, near Perené Bridge, alt. 700 m., Killip & A. C. Smith 25326 (NY, US). Vitoc, 13 km. from San Ramón, Soukup 2446 (US). AYACUCHO: Prov. Huanta: By the Río Pieni, Weberbauer 5635 (B, type of Lindmania weberbaueri Mez; F photo no. 11460). PUNO: San Gabán, July 1854, Lechler 2382 (G, type number of Schidospermum sanseviera Griseb. and of Chlorophytum schidospermum Baker; F photo no. 25148).

BOLIVIA: La Paz: Yungas, alt. 2000 m., Rusby 2541 (NY, type of Cottendorfia rusbyi Baker; US).

PUYA COMMIXTA L. B. Smith, sp. nov.

A P. lasiopoda L. B. Smith, cui valde affinis, spicis subsessilibus differt.

Flowering 6 dm. high; leaves 2 dm. long; sheaths ample, dark castaneous, forming a bulb 5 cm. in diameter; blades very narrowly triangular, 15 mm. wide at base, densely cinereous-lepidote beneath, glabrous above, laxly serrate with slender spreading brown spines 4 mm. long; scape slender, soon glabrous; scape-bracts imbricate, the lower foliaceous, the upper ovate, acuminate, pectinate, red, finely white-stellate; inflorescence laxly bipinnate, 25 cm. long, finely white-lanate; primary bracts more or less secund with the branches, broadly ovate, acuminate, red, chartaceous, the lower ones serrulate; spikes densely ellipsoid or obovoid, 5-7 cm. long, subsessile; floral bracts like the primary bracts but narrower and entire, about equaling the sepals; flowers erect; pedicels obconic, 3 mm. long, inconspicuous; sepals linear, acute, nearly 4 cm. long, 4 mm. wide, ecarinate; petals strongly contorted and purple when dry. Pl. II, fig. 9: Branch of inflorescence x 1/2; fig. 10: Sepal x 1.

Type in the U. S. National Herbarium, collected on dry open hillside among rocks, fog belt, on trail, 2-6 km. from Oconeque, Province of Sandia, Department of Puno, Peru, altitude 1800-2100 m., May 22-25, 1942, by R. D. Metcalf (No. 30591 of the University of California, Third Botanical Garden Expedition to the Andes directed by T. H. Goodspeed). Isotype in the University of California.

PUYA LOPEZII L. B. Smith, sp. nov.

A P. lanata (H.B.K.) Schult. f., cui valde affinis, bracteis florigeris apice contractis minoribusque, sepalis oblongis differt.

Known only from fragments but probably flowering over 1 m.

high: leaves rosulate, ca. 8 dm. long; sheaths suborbicular, 10 cm. long, the basal part yellow and glabrous, the apical dark castaneous and covered with coarse white appressed scales; blades narrowly triangular, 5 cm. wide, covered on both sides with appressed white scales, laxly serrate with flat brown uncinate spines 8 mm. long; upper part of scape 8 mm. in diameter, soon glabrous; upper scape-bracts ovate with a long narrowly triangular apex, exceeding the internodes but exposing most of the scape, entire, rugose when dry as if formerly fleshy; inflorescence simple, subdensely cylindric, interrupted at base, over 5 dm. long, densely and finely white-stellate; floral bracts broadly ovate, contracted to a narrowly triangular apex, the lowest exceeding the sepals, the upper much shorter; flowers suberect; pedicels obconic, 6 mm. long; sepals oblong, acute, 26 mm. long, ecarinate; petals 40 mm. long, yellowish; stamens included. Pl. II, fig. 11: Floral bract and flower x 1/2; fig. 12: Sepal x 1.

Type in the U. S. National Herbarium, collected on dry slopes, Huaylillas, Province of Pataz, Department of La Libertad, Peru, altitude 2300 m., May 24, 1961, by A. López and A. Sagástegui (No. 3549).

PUYA SAGASTEGUII L. B. Smith, sp. nov.

A P. lanata (H.B.K.) Schult. f., cui affinis, bracteis florigeris apice contractis, sepalis angustis minoribusque, petalis purpureis differt.

Known only from fragments but probably over 1 m. high; leaves over 8 dm. long; blades narrowly triangular, 25 mm. wide, covered on both sides with white appressed scales, laxly serrate with slender brown uncinate spines 7 mm. long; scape unknown; inflorescence simple, subdensely many-flowered, densely and finely pale-lanate, becoming subglabrous, the base unknown; floral bracts ovate, contracted to a caudate apex, shorter than the sepals (so far as known); flowers divergent; pedicels obconic, 5 mm. long; sepals linear-lanceolate, 23 mm. long, 3.5 mm. wide, ecarinate; petals with lateral folds, contorted after anthesis. Pl. II, fig. 13: floral bract and flower x 1/2; fig. 14: Sepal x 1.

Type in the U. S. National Herbarium, collected on dry slope, Huaylillas, Province of Pataz, Department of La Libertad, Peru, altitude,2500 m., May 24, 1961, by A. López and A. Sagástegui (No. 3548).

TILLANDSIA LOPEZII L. B. Smith, sp. nov.

A T. kuntzeana Mez, cui affinis, laminis foliorum subglabris, inflorescentia subdigitata differt.

Apparently stemless, flowering 65 cm. high; leaves 35 cm. long; sheaths ovate, ca. 10 cm. long, minutely appressed-lepidote, dark purple; blades ligulate-triangular, acuminate, 45 mm. wide, flat, green with purple splotches, very obscurely lepidote beneath; scape erect, 7 mm. thick, glabrous; scape-bracts erect, imbricate, the lower foliaceous but reduced, the upper ovate, apiculate, lustrous; inflorescence subdigitate from 6 spikes;

primary bracts suberect, broadly ovate, apiculate, to 4 cm. long; spikes subsessile, narrowly lanceolate, acute, 7-9 cm. long, 2 cm. wide, slightly complanate, densely 8-9-flowered; floral bracts broadly elliptic, acute, equaling or exceeding the sepals, sharply carinate, except for the apex and narrow margins drying nearly black and lustrous, coriaceous, glabrous; sepals elliptic, apiculate, 30 mm. long, glabrous outside, the posterior carinate, connate for 3 mm. Pl. II, fig. 15: Spike x 1/2; fig. 16: Posterior sepals x 1.

Type in the U. S. National Herbarium, collected on rocks, road to Cujibamba, Province of Bolívar, Department of La Libertad, Peru, altitude 3300 m., June 1, 1960, by A. López and A. Sagástegui (No. 3307).

TILLANDSIA SAGASTEGUII L. B. Smith, sp. nov.

A T. platyphylla Mez, cui affinis, foliorum laminis acuminatis, sepalis bracteas florigeras superantibus differt.

Flowering to 2 m. high; leaves over 1 m. long; sheaths oblong, scarcely distinguishable from the blades except by the brownish color, over 12 cm. wide, densely vestite with minute brown appressed scales; blades narrowly triangular, acuminate, flat, green, obscurely lepidote beneath, glabrous above; scape not seen; inflorescence amply tripinnate, essentially glabrous, glaucous; lower primary bracts subfoliaceous, nearly equaling the axillary branches, the upper primary bracts caudate from a broadly ovate base, shorter than the one-bracteate sterile base of the branches; branches of 4 subdigitate spikes, ascending, to 25 cm. long; spikes linear, complanate, to 15 cm. long including the short sterile base, 15-18 mm. wide, subdensely many-flowered; rhachis nearly straight, strongly winged; floral bracts more than twice as long as the internodes but exposing most of the rhachis, elliptic, broadly acute, ca. 17 mm. long, distinctly exceeded by the sepals at anthesis, ecarinate except near the minutely incurved apex, coarsely and faintly sulcate; pedicels inconspicuous, 2 mm. long; sepals free, oblong, subacute, 21 mm. long, subcoriaceous, glabrous outside, minutely lepidote inside, the posterior carinate; petal-blades elliptic, 18 mm. long, violet; stamens included. Pl. II, fig. 17: Apex of leaf x 1/2; fig. 18: Spike x 1/2; fig. 19: Sepal x 1.

Type in the U. S. National Herbarium, collected on trees, near Santiago, Guzmango, Province of Contumaza, Department of Cajamarca, Peru, altitude 2600 m., August 3, 1960, by A. Sagástagui (No. 3390).

TILLANDSIA TRUXILLANA L. B. Smith, sp. nov.

A T. cauligera Mez, cui affinis, spica laxiore, rhachi haud obtecta, sepalis liberis, petalis albis differt.

Caulescent; stem over 15 cm. long, 8 mm. in diameter; leaves densely imbricate, recurved-spreading, 20 cm. long, densely appressed-lepidote; sheaths elliptic, ca. 5 cm. long, merging with the blades, ferruginous; blades very narrowly triangular, long-acuminate, 20 mm. wide at base; scape distinct, 15 cm. long;

scape-bracts erect, densely imbricate, densely lepidote, the lower subfoliaceous but much reduced, the upper broadly elliptic and apiculate; inflorescence simple, broadly lanceolate, acute, 11 cm. long, 4 cm. wide, strongly complanate; rhachis flexuous, winged, soon glabrous; floral bracts erect, many times longer than the internodes but narrowed at base and exposing most of the rhachis, obovate, acute, 4 cm. long, minutely incurved at apex, ecarinate, densely lepidote, evidently fleshy because rugose on drying; pedicels 2 mm. long; sepals free, elliptic, broadly acute and apiculate, 28 mm. long, subcoriaceous, subdensely lepidote; petals 5 cm. long, white; stamens included; filaments plicate; style elongate. Pl. III, fig. 1: Spike x 1/2; fig. 2: Sepal x 1.

Type in the U. S. National Herbarium, collected on rocks, Camino de las Quishuas, Province of Bolívar, Department of La Libertad, Peru, altitude 3000 m., May 31, 1960, by A. López and A. Sagástegui (No. 3296).

VRIESEA CEREICOLA (Mez) L. B. Smith, Phytologia 6:194. 1958.
Tillandsia cereicola Mez in Fedde, Rep. Nov. Spec. 3:34. 1906.
Vriesea lopezii L. B. Smith, Phytologia 4:218, pl. 2, figs. 8-10. 1953.

Vriesea lopezii was described before I realized that Tillandsia cereicola was a Vriesea. Now I can find no good distinction between the two species.

BOLIVIA

BILLBERGIA MICROLEPIS L. B. Smith, sp. nov.

A B. formosa Ule, cui affinis, inflorescentia laxa elongata, sepalis minoribus differt.

Known only from fragments but apparently the habit typical of Billbergia subgenus Helicodea; leaves 50-75 cm. long, densely appressed-lepidote on both sides, white-banded beneath; sheaths elliptic, over 26 cm. long; blades ligulate, subacute and apiculate, 5-7 cm. wide, laxly serrate with flat black spreading teeth 1.5-5 mm. long; scape slender, decurved, finely pale-lepidote; scape-bracts elliptic, acute, to 13 cm. long, the lower erect, imbricate, the upper divergent to spreading; inflorescence simple, lax, 15 cm. long, the rhachis densely pale-lepidote; floral bracts broadly ovate, apiculate, the lowest almost equaling the ovary, the others much shorter; flowers sessile; sepals subequal, lance-oblong, attenuate, 20-24 mm. long, soon glabrous except at base; petals linear, over 14 cm. long, greenish when dry, recoiling in a tight spiral at anthesis, bearing 2 truncate dentate scales at base; ovary ellipsoid, sulcate with dark lines against the white indument, 9 mm. high exclusive of the 3 mm. short-cylindric epigynous tube. Pl. III, fig. 3: Floral bract and flower x 1/2; fig. 4: Sepal x 1.

Type in the Gray Herbarium of Harvard University, collected on tree, Copacabana (about 10 km. south of Mapiri), Province of Larecaja, Department of La Paz, Bolivia, altitude 850-950 m., October 8-November 15, 1939, by B. A. Krukoff (No. 11158).

PITCAIRNIA CARDENASII L. B. Smith, sp. nov.

A P. palmeri S. Watson, cui valde affinis, rhizomatibus aucta, foliis integerrimis differt.

Reproducing vegetatively by slender scaly rhizomes, flowering 30-60 cm. high; leaves forming bulbous rosettes that soon appear lateral by the elongation of the rhizome, entire, vestite with linear white subspreading scales; sheaths broadly ovate, 2 cm. long, strongly nerved, castaneous toward base; blades dimorphic, some persistent, reduced, broadly triangular, thin, stramineous, others deciduous along a straight transverse line, linear, attenuate, 10 cm. long (probably not fully developed), 2 mm. wide, fasciculate; scape very slender, white-flocculose especially toward base; scape-bracts erect, the lower imbricate, subfoliaceous and with deciduous blades, the upper narrowly triangular, shorter than the internodes; inflorescence secundly racemose, red, sparsely white-flocculose; floral bracts narrowly triangular, exceeding the slender 6-8 mm. long pedicels; flowers suberect; sepals oblong, acute, 18 mm. long, carinate at base; petals linear-spatulate, rounded-apiculate, 45 mm. long, naked; stamens included; ovary 4/5 superior; seeds caudate-appendaged. Pl. III, fig. 5: Leaf-blade x 1/2; fig. 6: Inflorescence x 1/2; fig. 7: Sepal x 2.

Type in the U. S. National Herbarium, collected in thicket on wet rocky slopes, near Cuesta de Monos, Department of Santa Cruz, Bolivia, altitude 1000 m., November 1950, by M. Cárdenas (No. 4648).

Originally I confused this specimen with Pitcairnia rigida Mez, giving rise to the dubious citation of that species in R. C. Foster, Catalogue of the Ferns and Flowering Plants of Bolivia (p. 40).

TILLANDSIA STREPTOCARPA Baker, Journ. Bot. 25:241. 1887.
Tillandsia soratensis Baker, Journ. Bot. 25:235. 1887.
Tillandsia condensata Baker, Handb. Bromel. 164. 1889.
Tillandsia apoloënsis Rusby, Bull. N. Y. Bot. Gard. 6:489. 1910.

BOLIVIA: La Paz: Apolo, alt. 1440 m., September 11, 1902, R. S. Williams 1483 (NY, type of T. apoloënsis). Cochabamba: Tunari, alt. 1300 m., Kuntze s. n. (NY, type of T. soratensis). Santa Cruz: West Velasco, alt. 200 m., Kuntze s. n. (NY, type of T. condensata).

On attempting to differentiate the above species in a key, the characters previously used proved to be quite trivial and unreliable when compared with those of the type of Tillandsia streptocarpa (Balansa 615, from Paraguay, at Kew).

TILLANDSIA SUBTROPICALIS L. B. Smith, sp. nov.

A T. kuntzeana Mez, cui affinis, foliorum laminis supra glabris, scapi bracteis glabris, bracteis florigeris haud incurvatis, floribus multo minoribus differt.

Stemless, flowering 3 dm. high; leaves 15 or more in a funnelform rosette, 20-23 cm. long; sheaths broadly elliptic, 6-7 cm.

long, dark castaneous, densely and minutely appressed-lepidote; blades ligulate with a long attenuate apex, 15-20 mm. wide, covered beneath with fine appressed cinereous scales, glabrous above; scape erect, slender; scape-bracts densely imbricate and concealing the scape, the lowest subfoliaceous, the others elliptic, glabrous and lustrous except for the small narrow blade; inflorescence laxly bipinnate from 5-7 spikes, glabrous; primary bracts ovate, about half as long as the spikes; spikes subspreading, subsessile, lanceolate, acute, 45 mm. long, 12 mm. wide, strongly complanate, dense; floral bracts imbricate and wholly concealing the rhachis, ovate, acute, 18 mm. long, sharply carinate with a straight apex, coriaceous, even, lustrous; sepals lanceolate, acute, 15 mm. long, the posterior carinate, 2/3 connate. Pl. III, fig. 8: Apex of leaf x 1/2; fig. 9: Inflorescence x 1/2; fig. 10: Posterior sepals x 1.

Type in the U. S. National Herbarium, collected in the sub tropical region, at Hacienda Casana on the road to Tipuani, Department of La Paz, Bolivia, 1400 meters altitude, August 5, 1922, by O. Buchtien (No. 7185).

BOLIVIA: Same as type, October 15, 1922, Buchtien 7187 (US).

BRAZIL

AECHMEA NUDICAULIS (L.) Griseb. var. AEQUALIS Smith & Reitz, var. nov.

A var. mudicaulis scapi bracteis fere aequalibus, supremis non aggregatis differt.

Scape-bracts small, nearly equal, not massed below the inflorescence; lowest floral bracts elliptic, attenuate, exceeding the ovaries. Pl. III, fig. 11: Scape and inflorescence x 1/2.

Type in the U. S. National Herbarium, collected in Cariacica, State of Espirito Santo, Brazil, by Alvim Seidel (No. 6-14).

QUESNELIA SEIDELIANA Smith & Reitz, sp. nov.

A Q. lateralis Wawra, cui valde affinis, scapi bracteis valde remotis, inflorescentia floribusque parvis differt.

Stemless, flowering 5 dm. high; leaves few in a fasciculate rosette, 35-40 cm. long, covered with white closely appressed dark-centered scales; sheaths elliptic, nearly 20 cm. long, tinged with dark purple especially within; blades ligulate, rounded and apiculate, 45 mm. wide, green, concolorous, laxly serrulate with dark spines 1 mm. long; scape central, erect, very slender, finely white-lanate, becoming glabrous; scape-bracts few and remote, lanceolate, thin, closely enfolding the scape, entire, inconspicuously pale-lepidote; inflorescence simple, strobilate, ellipsoid, 3 cm. long exclusive of the petals; floral bracts broadly ovate, acute, ca. 2 cm. long, about equaling the sepals, thin, nerved, pale-lepidote, yellow when dry; flowers sessile; sepals oblanceolate, acute, 15 mm. long, connate for 3 mm., white-lepidote; petals "sky blue", 25 mm. long, bearing 2 fimbriate scales at base, the blades elliptic, obtuse; stamens included; ovary ellipsoid. Pl. III, fig. 12: Apex of leaf x 1/2;

fig. 13: Inflorescence and upper scape x 1/2; fig. 14: Sepal x 1.
Type in the U. S. National Herbarium, collected in the State of Rio de Janeiro, Brazil, by Alvim Seidel (No. 62-3).

VRIESEA BARILLETII E. Morr. Belg. Hortic. 33:33, pl. 3. 1883.
BRAZIL: Cultivated in the botanical garden of Liége, 1883, and supposedly coming from Ecuador, E. Morren (LG, type; photo GH). Central Brazil, Alvim Seidel (US).
Alvim Seidel, in his search for new and rare species of ornamental bromeliads, has discovered Vriesea barilletii growing naturally in central Brazil. This is not altogether surprising since all its near relatives are Brazilian and the record from Ecuador has long been regarded with suspicion.

SYNOPSIS OF AMERICAN VELLOZIACEAE

SUPPLEMENT II

Lyman B. Smith

As frequently happens, publication in a new field is followed by offers of more material to study. In this instance the study of the unidentified American Velloziaceae from the herbarium of the Royal Botanic Gardens, Kew, has yielded nine novelties and some interesting new records for old species.
The species here are numbered in conformity with the sequence in my original paper in Contributions from the United States National Herbarium, volume 35, part 4. The figures are all natural size.

1a. VELLOZIA LAEVIS L. B. Smith, sp. nov.
A V. macedoni Woodson, cui affinis, staminibus 6 basi exappendiculatis differt.
Nearly stemless, simple; leaves many, densely subrosulate; sheaths elliptic, 15 mm. long, very closely and coarsely nerved, brown, lustrous, glabrous, dividing and recurving at apex with age; blades long-persistent, linear, attenuate to a rounded retuse apex, 6-8 cm. long, 1.5-3.3 mm. wide, laxly serrulate on the thickened margins and beneath on the keel, glabrous; scape solitary, 8 cm. long, very slender, glabrous; ovary subglobose, 4 mm. long, smooth; tepals elliptic, rounded and apiculate, 12 mm. long, red; stamens 6, about half as long as the tepals, the filaments triangular-dilated at base and short-connate, not appendaged. Fig. 1: Leaf-blade; fig. 2: Ovary, tepal, and stamen.
BRAZIL: Minas Gerais: Among rocks, Caraça, 1824, Riedel s. n. (K, type).

Plate I

Fig. 1-3: Tillandsia leucolepis; fig. 4-6: Vriesea ampla; fig. 7-10: V. hainesiorum

Plate II

Fig. 1, 2: Vriesea leucophylla; fig. 3-5: Tillandsia romeroi; fig. 6-8: Vriesea magdalenae; fig. 9, 10: Puya commixta; fig. 11, 12: P. lopezii; fig. 13, 14: P. sagasteguii; fig. 15, 16: Tillandsia lopezii; fig. 17-19: T. sagasteguii.

Plate III

Fig. 1, 2: Tillandsia truxillana; fig. 3, 4: Billbergia microlepis; fig. 5-7: Pitcairnia cardenasii; fig. 8-10: Tillandsia subtropicalis; fig. 11: Aechmea nudicaulis var. aequalis; fig. 12-14: Quesnelia seideliana.

11a. VELLOZIA CRISPATA L. B. Smith, sp. nov.

A V. compacta Mart. ex Schult. f., cui affinis, floribus folia superantibus differt.

Caudex simple, 5 cm. long, terete and 13 mm. in diameter including the leaf-sheaths; leaves very densely imbricate, the complete ones 15-25 at the top of the caudex; sheaths ample, ca. 3 cm. long, very closely and coarsely nerved, yellow, lustrous, glabrous, the apices split into fibers and recurved in tight spirals with age; blades linear, attenuate to a blunt retuse apex, 11-12 cm. long, 5 mm. wide, laxly serrulate on the thickened margins and beneath on the keel, glabrous; scape solitary, 12 cm. long, 1.5 mm. thick, subdensely vestite with short pale clavate trichomes; ovary obovoid, trigonous, 16-18 mm. long, scabrous on the base and angles; tepals elliptic, 5 cm. long; stamens numerous, probably included, the phalanges bearing numerous short teeth; style 25 mm. long. Fig. 3: Apex of leaf; fig. 4: Ovary; fig. 5: Base of tepal and stamens.

BRAZIL: Rio de Janeiro or Minas Gerais: "Environs de Rio de Janeiro et d'Ouro Preto, 1883-84," Glaziou 15501 (K, type).

20a. VELLOZIA DROSEROIDES L. B. Smith, sp. nov.

A V. echinata Goeth. & Henr., cui affinis, ovario multicostato lineatim glanduloso differt.

Caudex simple, 3 cm. long, terete and 15 mm. in diameter including the leaf-sheaths; leaves very densely imbricate, the complete ones 10-15 at the top of the caudex; sheaths 2 cm. long, closely nerved except near the margin, yellow-brown, sublustrous, glabrous, with age deeply divided into fine straight fibers; blades linear, attenuate to a small blunt apex, 7-12 cm. long, 3 mm. wide, laxly serrulate on the margins and beneath on the keel, glabrous; scape solitary, 6-10 cm. long, 0.8 mm. thick, subdensely vestite with short-stipitate glands; ovary ellipsoid, 6-8 mm. long, 10-12-costate with the stipitate glands in irregular lines but well distributed; tepals elliptic, 2 cm. long. Fig. 6: Apex of leaf; fig. 7: Ovary.

BRAZIL: Minas Gerais: Serra da Lapa, November 1824, Riedel 1053 (K, type).

27b. VELLOZIA VESTITA L. B. Smith, sp. nov.

A V. bicolore L. B. Smith, cui affinis, foliorum vaginis omnino lanatis per aetatem grosse fibroso-divisis, laminis angustioribus differt.

Caudex simple, 10 cm. long, terete and 3-4 cm. in diameter including the leaf-sheaths; leaves very densely imbricate, the complete ones about 12 at the top of the caudex; sheaths ample, 25 mm. long, dark, lustrous, pale-lanate throughout, with age splitting into very coarse straight fibers; blades linear, attenuate to a minutely blunt apex, 24 cm. long, 14 mm. wide, entire, green and glabrous above, densely white-lanate beneath; scape solitary, 28 cm. long, 2.5 mm. thick, densely and finely stipitate-glandular; ovary subglobose, 10 mm. long, completely covered with very fine stipitate glands; tepals elliptic, 5 cm. long, the outer

densely glandular; stamens included, 12 or more. Fig. 8: Apex of leaf; fig. 9: Flower.

BRAZIL: Minas Gerais: 1892, Glaziou 19935 (K, type).

31a. VELLOZIA METZGERAE L. B. Smith, sp. nov.

A V. pilosa Goeth. & Henr., cui affinis, foliis dense cinereo-pilosis, floribus folia subduplo superantibus, ovario densissime glanduloso-piloso differt.

Subacaulescent, simple; leaves very densely imbricate, the complete ones 4-5 at the top of the caudex; sheaths ample, 10-15 mm. long, very closely and coarsely nerved, dark brown, sublustrous, glabrous except the pilose apex, with age splitting into straight coarse fibers; blades linear, 5-7 cm. long, 3 mm. wide, densely cinereous-pilose throughout; scape solitary, 9-10 cm. long, 0.7 mm. thick, vestite especially toward apex with short-stipitate glands; ovary globose, 5 mm. long, very densely and finely pilose-glandular; tepals narrowly elliptic, 15-20 mm. long red, glandular at base and the outer at apex; stamens included; style 14 mm. long. Fig. 10: Apex of leaf; fig. 11: Flower.

BRAZIL: Minas Gerais: Serra da Lapa, November 1824, Riedel s. n. (K, type).

This species is named in honor of Frau Crista Metzger in recognition of her help in making type-photographs of Velloziaceae available.

38a. VELLOZIA BREVIFOLIA Seubert var. ANGUSTIOR L. B. Smith, var. nov.

A var. brevifolia laminis foliorum longioribus angustioribusque differt.

Leaf-blades linear, 5-7 cm. long, 3 mm. wide. Fig. 12: Apex of leaf; fig. 13: Flower.

BRAZIL: Minas Gerais: Serra da Lapa, November 1824, Riedel s. n. (K, type).

38b. VELLOZIA ARENICOLA L. B. Smith, sp. nov.

A V. brevifolia Seubert, cui affinis, caudici simplici, scapo brevissimo, ovario ellipsoideo differt.

Subacaulescent, simple; leaves very densely imbricate, the complete ones 10-13 at the top of the caudex; sheaths ovate, 2 cm. long, yellow, lustrous, very closely nerved, glabrous, incurved at apex with age and more or less divided; blades linear, obtuse, 6-10 cm. long, 3.5 mm. wide, serrulate on the thickened margins and beneath on the keel, glabrous; scape solitary, very short; flower hidden among the terminal leaves; ovary ellipsoid, 6 mm. long, covered with pale long-stipitate glands; tepals narrowly elliptic, 4 cm. long, the outer glandular at base; stamens numerous, about half as long as the tepals, denticulate-appendaged at base. Fig. 14: Apex of leaf; fig. 15: Ovary.

BRAZIL: Minas Gerais: In sand, Tijuco (Diamantina), December 1824, Riedel s. n. (K, type).

49. VELLOZIA GRANULATA Goeth. & Henr. Blumea 2:373. 1937.
Leaf-blades as short as 2 cm. and as narrow as 4 mm. Fig. 16: Apex of leaf; fig. 17: Flower.
BRAZIL: Minas Gerais: Serra da Lapa, November 1824, Riedel s. n. (K).

60. VELLOZIA SWALLENII L. B. Smith, Contrib. U. S. Nat. Herb. 35: 265, pl. 9, figs. 9, 10. 1962.
BRAZIL: Goiás: Goiás City to Cavalcante, 1828, Burchell 7586 (K). Maranhão: Carolina to Pará, 1829, Burchell 8972 (K).

60a. VELLOZIA BLANCHETIANA L. B. Smith, sp. nov.
A V. swallenii L. B. Smith, cui affinis, foliorum vaginis vix divisis, laminis margine serrulatis, ovarii tuberculis truncatis differt.
Caudex at least 4 cm. long (incomplete), simple (?); leaves very densely imbricate, the complete ones 7-8 at the top of the caudex; sheaths ample, 3 cm. long, dark brown, lustrous, glabrous, closely nerved, splitting but slightly with age but then pectinate-fibrous by the persistence of fine cross-strands; blades linear, attenuate to a filiform apex, 23-28 cm. long, 6-8 mm. wide, serrulate on the thickened margins and obscurely so on the keel beneath, otherwise smooth and glabrous; scapes 2, 5 cm. long, 3 mm. thick at apex, narrowing downward, densely and finely truncate-tuberculate especially toward apex; ovary subcylindric, 1 cm. long, densely truncate-tuberculate; tepals free (only the bases known); style at least 35 mm. long. Fig. 18: Section of leaf-blade; fig. 19: Ovary.
BRAZIL: Bahia: Serra Assuruá, near Rio São Francisco, 1828, Blanchet 2814 (K, type).

46a. BARBACENIA PLANTAGINEA L. B. Smith, sp. nov.
Ex affinitate B. hilairei Goeth. & Henr. atque B. oxytepala Goeth. & Henr. sed ab omnibus speciebus foliorum laminis brevibus amplis apice late rotundatis et acuminulatis differt.
Subacaulescent, simple, glabrous; leaves about 7; sheaths broadly ovate, 2 cm. long, closely nerved except the broad thin margin, yellow-brown, lustrous; blades oblong, broadly rounded then long-acuminate, 6-9 cm. long, to 2 cm. wide, serrulate on the thickened margins and beneath on the keel; scape solitary, 10-13 cm. long, 1.3 mm. thick, curved; flowers red; perianth-tube very slenderly and regularly cylindric without enlargement for the ovary, curved, 5 cm. long, 4 mm. in diameter; tepals suberect, oblong, obtuse, 25 mm. long; stamens 12 mm. long; filaments oblong with flaring base and large suborbicular lobes; anthers linear, exceeding the filaments by 5 mm.; ovary 2 cm. long. Fig. 20: Apex of leaf; fig. 21: Flower; fig. 22: Stamen (abaxial side).
BRAZIL: Minas Gerais: Serra da Lapa, December 1824, Riedel 1061 (K, type).

American Velloziaceae

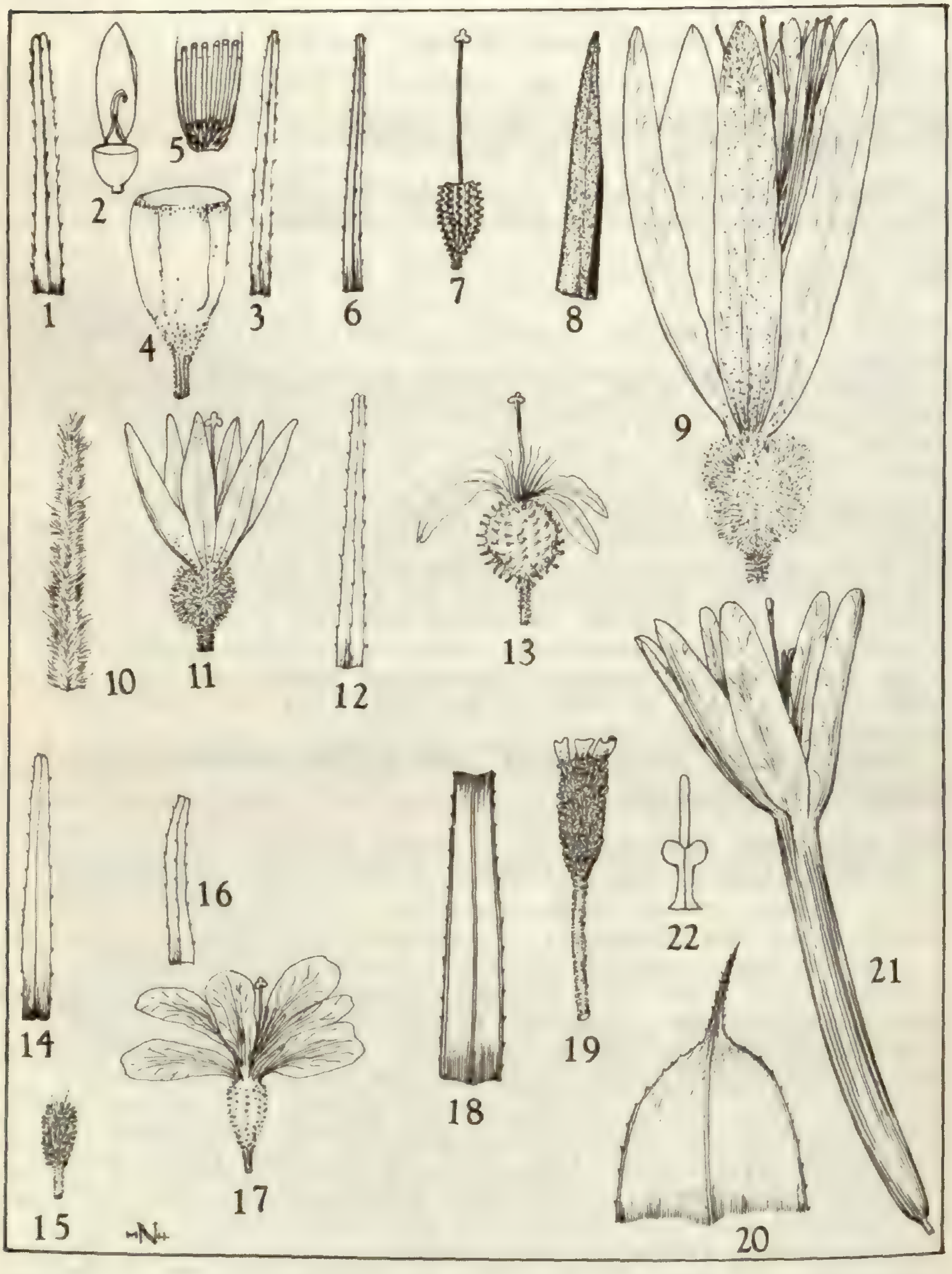

Fig. 1, 2: Vellozia laevis; fig. 3-5: V. crispata; fig. 6, 7: V. droseroides; fig. 8, 9: V. vestita; fig. 10, 11: V. metzgerae; fig. 12, 13: V. brevifolia var. angustior; fig. 14, 15: V. arenicola; fig. 16, 17: V. granulata; fig. 18, 19: V. blanchetiana; fig. 20-22: Barbacenia plantaginea.

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